CITY OF EDMONDS

CLIMATE ACTION PLAN 2023

MARCH 2023

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A Call To Action

Global climate change is already harming many regions, including the Pacific Northwest. It is expected to grow worse and become irreversible unless human-generated greenhouse gas (GHG) emissions can be eliminated. To achieve the future Edmonds has envisioned for itself in its Comprehensive Plan, a community with a high quality of life that is sustainable and equitable for all residents, Edmonds recognizes that eliminating GHG emissions is critical. This cannot be accomplished without action at every level from national, state, local, and individual. Edmonds passed resolutions, developed a Climate Action Plan (CAP) in 2010, and taken several steps toward implementing that plan.

The concentration of carbon in the atmosphere, a key indicator of GHG levels, has more than doubled since the beginning of the Industrial Revolution.

However, the most important finding of this update to Edmonds' Climate Action Plan is that the Edmonds community has not kept pace with its own goals for reducing GHG emissions. Edmonds is not alone in failing to do so – most nations also failed to achieve the reductions agreed to in the 1997 Kyoto Protocol. As a result, an even more ambitious rate of emissions reduction must be achieved to avert the worst harm from global climate change that is being driven by GHG emission. The City took its first step with adoption of Resolution 1453, which commits the City to a science-based target of 1.5 degree Celsius global temperature rise.[1] To meet that target, the Edmonds community must be carbon neutral by 2050. We have a long way to go, but, as this plan shows, we have reason to hope we can get there.

"When the well is dry, we know the worth of water."

- Benjamin Franklin

Edmonds adopted its first Climate Action Plan in 2010. That plan set goals that seemed ambitious but achievable: reduce emissions to 7% below 1990 levels by 2012 (per the Kyoto Protocol), 25% below 1990 levels by 2035, and 50% below 1990 levels by 2050 (per Washington State GHG goals in place at the time). As a part of this current update, the City conducted another inventory of GHG emissions in 2017.

The 2017 inventory found that Edmonds reduced GHG emissions in some sectors but increased emissions in others. The largest driver of these increases is emissions from on-road transportation, which increased 27% between 2000 and 2017. In addition, natural gas consumption in buildings increased by 25%.[2] The inventory concluded that, 12 years after setting plans to begin reducing GHG

Despite Edmonds' stated commitment to reduce GHG emission, per capita emissions remained essentially the same in 2017 as they were in 2000.

1 See the Introduction for an explanation of this target.

2 See the Summary of GHG Inventory for further details.

emissions, per capita emissions in Edmonds have remained essentially the same since 2000. However, recent state legislation and changes in market conditions suggest Edmonds can make progress in the years ahead.

State legislation adopted in 2019 requires that electricity in the state be carbon-neutral by 2030 and carbon-free by 2045. Snohomish Public Utility District, which provides Edmonds electricity, is well on the way to meeting that goal. That means switching from fossil fuels to electricity is the easiest way to reduce GHG emissions. In addition, the automotive industry is rapidly moving toward electric vehicles, with major manufacturers planning to eliminate combustion engine vehicles by 2030 or earlier. Together, these two changes will move Edmonds closer to its goal of being carbon neutral by 2050. Even with these changes, the City of Edmonds and the Edmonds community must do more.

The most effective steps the City can take are:

1. Adopt regulations to require new multi-family and commercial buildings to be 100% electric by 2023.[3]
2. Require more charging infrastructure with new development.[4]
3. Support mixed-use and transit-oriented development in neighborhood commercial centers.[5]
4. Coordinate with transit agencies to increase service within Edmonds and improve access to new light rail connections.[6]
5. Develop an action plan to adapt to sea level rise in Edmonds.[7]

The most effective steps that individuals and businesses in Edmonds can take are:

1. Replace fossil-fuel burning heating systems, hot water heaters, and cooking equipment powered with efficient electric appliances.[8]
2. Replace fossil fuel-burning vehicles with electric vehicles.[9]
3. Reduce vehicle trips by using transit, telecommuting, biking or walking.[10]
4. Conserve energy wherever possible, especially energy from fossil fuels.

3 See Strategies BE-3.
4 See Strategy TR-5.
5 See Strategy TR-1.
6 See Strategies TR-2.
7 See Strategy EN-3.
8 See Strategy BE-2.
9 See Strategy TR-5.
10 See Strategies TR-3 and TR-4.

This plan identifies actions that the City and community can take to remain on target through 2035. Beyond 2035, even assuming widespread adoption of electric vehicles, fossil fuels are likely to remain in use for heating and other purposes unless state energy regulations governing those fuels change. One of the actions identified in the plan is for the City to support those regulatory changes. In addition, Edmonds and other communities will have to seek additional ways to reduce consumption of these fuels, and to sequester carbon in forests, aquatic vegetation or through technologies that are still in early stages of development.

"I think calling it climate change is rather limiting. I would rather call it the everything change."

- Margaret Atwood, author

This update also introduces the subject of equity in the discussion of climate change. National studies show that affluent households, those with incomes above $120,000, produce GHG emissions that are double those of households with and income between $40,000 and $80,000. A large majority of those emissions occur outside of the city limits, in other communities and other nations. The median income in Edmonds in 2020 was $91,499, placing it in the 95th percentile for household income in communities in the US. This means that the choices we make in Edmonds, what we consume and how much, have ripples far beyond Edmonds. It also highlights the fact that many people in the US consume less and therefore are responsible for fewer GHG emissions than the average Edmonds resident. It is incumbent on those of us causing the greatest impact and with the greatest means to effect change and lead the way in addressing the climate crisis. We can learn from those who consume less and produce fewer GHG emissions. In addition, by helping those with limited means to convert to efficient and carbon-free energy for their homes, businesses, and travel, we can also lower their cost burden in the long run, because today's high efficiency appliances and electric vehicles cost less to operate. Also, if rental property owners convert to energy- efficient appliances and fixtures, the energy cost burden would be reduced for the future renter or tenant. As John Doerr, a successful investor in technology put it, "it is now cheaper to fix the planet than to ruin it."

Finally, this plan examines some of the ways climate change is likely to affect Edmonds. It identifies steps we need to take to understand and prepare for changes to rainfall and snowpack, summer heat and drought, and sea level rise. Edmonds has only begun to fully grasp what those changes could mean, but they are likely to have a profound effect on the future of our community.

This Plan provides a roadmap and a few indicator metrics that will help the community know how we are doing. It is a call to action. It is not too late to address the climate crisis. The tools to do so have never been better and they are improving steadily. It will take effort on the part of the City, state and federal governments, and individuals to make use of those tools. It is time to get to work.

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Introduction

For over a decade, Edmonds has been committed to taking action to prevent the harms from climate change caused by the accumulation of "greenhouses gases"(GHGs) released by human activity. The consequences for the world of ignoring climate change are enormous. Sea level rise will immerse cities and farmland occupied by millions of people, causing erosion and flooding, including downtown Edmonds as well as other areas around Puget Sound. Drought and higher land temperatures will destroy crops and forests, and place millions more in danger of food and water shortages. Rising ocean temperatures and acidity will affect marine species on which much of the web of life depends, and further disrupt human food supplies. The cost of all of this will fall on future generations, much of it disproportionately on those with the fewest resources to adapt. Only with global action can these effects of climate change be mitigated, and Edmonds recognizes that it bears responsibility as citizens of the world and stewards of our environment.

A subcommittee of the City of Edmonds' Citizens Committee on the US Mayors Climate Protection Agreement convened in 2006, and in 2009 drafted the first comprehensive plan for climate action, using volunteer effort and with City staff support. The City of Edmonds adopted a Climate Action Plan in 2010 (2010 CAP), setting goals to substantially reduce GHG emissions generated by the Edmonds community, in accord with the US Mayors Climate Protection Agreement.

The targets set by the 2010 CAP came from several sources. Edmonds' adoption of the US Mayors Climate Protection Agreement stipulated that the City reduce its GHG emissions to 7% below 1990 levels by 2012, per the Kyoto Protocol. At the same time, Washington State mandated that GHG emissions be reduced to 1990 levels by 2020; 25% below 1990 levels by 2035; and 50% below 1990 levels by 2050. In addition, the United Nations' Intergovernmental Panel on Climate Change (IPCC) has determined that GHG emissions must be reduced to 80% below 1990 levels on a global scale by 2050 to arrest the effects of climate change. Although these goals were not entirely consistent, all were acknowledged in Edmonds' 2010 CAP.

Using the GHG inventory protocol in place in 2009 and the best available data for 1990, Edmonds' communitywide GHG emissions in 1990 were calculated to have been approximately 178,000 MT CO2e. The estimated 2009 GHG emissions were 282,000 MT CO2e; therefore, the 2010 CAP stated that by 2012, Edmonds' GHG emissions must be reduced by at least 41% to meet the Kyoto Protocol.

What are GHGs and what does MT CO2e mean?

Several gases contribute to the "greenhouse effect" that is causing climate change. The most common of these is carbon dioxide (CO2). CO2 is emitted whenever carbon-containing fossil fuels are used, such as for home heating or in automobiles. Other GHGs include methane, nitrous oxide, and several fluoride-containing gases, which are released in resource extraction and transport, some manufacturing processes, and operation of certain equipment like refrigerators. These other gases may have several times greater effect on the atmosphere than CO2 does. To express the total quantity of GHGs using a single unit of measure, GHGs are counted in terms of metric tons (tonnes) of carbon dioxide equivalent units, which is abbreviated as **MT CO2e**.

Timeline of City and State Actions

1990 – Washington State passes the Growth Management Act, requiring municipalities to identify and protect their natural resources and to plan their growth based on demographic projects.

September 2006 – City Council adopted Res. 1129 and 1130, joining the US Mayors Climate Protection Agreement and the International Council for Local Environment Initiatives. This formally expressed support for and committed Edmonds to pursuing the United States' goal of the 1997 Kyoto Protocol – reducing annual greenhouse gas emissions to 7% below 1990 levels by 2012.

2007 – Became an ENERGY STAR partner with the EPA, employing the ENERGY STAR Portfolio Manager to track energy usage monthly in 16 City buildings.

2008 – Parks and Recreation began using Integrated Pest Management to reduce its reliance on industrial chemical pesticides. Parks now only uses natural, organic pesticides and uses 60% less than before.

March 2008 – The State Legislature passed ESSHB 2815 as part of the Governor's Climate Change Framework, which was later amended in 2010 by SSB 6373 to align with the EPA's Greenhouse Gas Reporting Program. This committed Washington to reduce emissions to 1990 levels by 2020, 25% below 1990 levels by 2035, and then 50% below 1990 levels by 2050.

April 2008 – Council adopted Resolutions 1168 and 1169, establishing the USGBC's LEED Silver standard for new facilities and joining the Cascade Agenda to conserve working farms, forests, and natural resources while creating vibrant, livable communities in a strong regional economy.

June 2009 – The City inventoried Edmonds' 2000 and 2005 annual greenhouse gas emissions.

December 2009 – Included a Community Sustainability Element in the Comprehensive Plan

2010-2011 – The City leverages a Federal Energy Efficiency and Conservation Block Grant to purchase hybrid- and battery-electric vehicles, starting its ongoing vehicle electrification transition.

February 2010 – Publication of the City of Edmonds' first Climate Change Action Plan, created by a volunteer subcommittee of the Committee on the US Mayors Climate Protection Agreement. It relied on community input, Edmonds' draft 2008 Comprehensive Plan's Community Sustainability Element, and the 2008 Governor's Climate Action Plan.

September 2010 – Council adopted Ordinance 3807, creating the Tree Board, now codified in Chapter 10.95. This was later amended in 2016 with Ordinance 4034 in pursuit of maintaining Edmonds' Tree City USA status. Council tasked the Tree Board with supporting Edmonds urban forestry efforts to preserve existing trees, plant more, and encourage stewardship among our community.

August 2010 – Edmonds becomes the first city in Washington to ban plastic single-use shopping bags.

2011 – The City installed six Level 2 high-voltage electric vehicle charging stations in public spaces. These include the City Park, City Hall, the Public Safety Building, and in the right-of-way at Main St. and 6th Ave.

City hall receives Energy Star recognition from the EPA for operating 20% more efficiently than comparable structures across the country, and reducing its power consumption by 5% since 2007.

January 2011 – Council amends Chapter 20.20 to encourage limited businesses opportunities from residents' homes (Ord. 3840), later expanded to include urban farming (Ord. 3889).

May 2011 – Community input and partnership with Climate Solutions generated the New Energy Cities Action Plan. This document described immediate and future actions the

City could take to improve efficiency and conservation in Edmonds.

June 2011 – Council passes the Complete Streets Ordinance (Ord. #3842), to make investments in pedestrian, cyclist, and transit during any changes to the streetscape.

October 2011 – The Frances Anderson Center hosts the Edmonds Community Solar Cooperative, a public-private partnership. Capitalizing on Washington Solar Production Incentives, the co-op enables investors in Washington to fund this transition to solar energy and receive annual dividends.

January 2012 – The City developed an Energy Plan, documenting energy efficiency accomplishments and highlighting potential future investments. From 1999 to 2010, the City reduced municipal energy consumption by 15%.

May 2013 – Public Works began the preliminary feasibility study of daylighting Willow Creek, a tributary of Edmonds Marsh, the only remaining saltmarsh in our watershed. Wetlands serve a critical ecological role in flood mitigation, relevant to sea level rise.

July 2015 – The City joined the Safe Energy Leadership Alliance to express concerns to the Army Corps of Engineers about the environmental impacts of the proposed Tesoro Savage Petroleum Terminal in Vancouver, WA. The terminal was ultimately never built, reducing further investment in fossil fuels.

May 2016 – Council adopts Ordinance 4026 to conserve natural resources and reduce geologic risks as required by Washington's 1990 Growth Management Act. Council also passed Resolution 1357, adopting Zero Waste and Beyond Waste as long-term goals.

March 2017 – The City purchased riparian and wetland habitat surrounding Shell Creek north of Yost Park.

June 2017 – Council adopts Ordinance 4072, codifying the Edmonds Shoreline Master Program in Title 24. This Master Program guides and supports Edmonds' responsibilities to the Washington State Shoreline Management Act of 1971.

June 2017 – Mayor Earling signed onto the Mayors' National Climate Action Agenda and Council adopted Res. 1389, committing Edmonds to the goal of the Paris Agreement - limiting the global average temperature increase to within 1.5°C.

November 2017 – Council amends the code to incorporate more low-impact development standards, including shade tree requirements of new parking lots (Ord. 4085).

January 2018 – The City challenged its community to reduce their greenhouse gas emissions through its Taming Bigfoot competition, inspired by a similar effort in Jefferson County on the Olympic Peninsula.

January 2019 – The City inventoried the 2017 annual greenhouse gas emissions of Edmonds to update its progress and serve as the baseline for the 2023 Climate Action Plan.

February 2019 – Council adopted reduced residential parking standards in the Downtown Business zones in Ordinance 4140.

July 2019 – The City adopted its Urban Forest Management Plan to manage, enhance, and expand Edmonds' tree canopy coverage over the next 20 years. The plan emphasizes trees on public property and rights-of-way.

September 2019 – The City received the Edmonds Marsh Baseline Monitoring Study from its consultant, which established the health and biodiversity of the Edmonds Marsh ecosystem. This baseline is essential for monitoring the Marsh.

September 2020 – The EPA awarded Edmonds' wastewater treatment plant a 2020 Utility of the Future Today for its efficiency improvements, which reduce electricity consumption by 19% and fuel oil consumption by 44%. Public Works continues to pursue more efficient operations at the treatment plant.

To meet the State-mandated reductions, GHG emissions would need to be reduced 52% by 2035 and 68% by 2050, and this still would not be enough to meet the IPCC target.

In 2017, responding to the Paris Agreement (signed on Earth Day 2016) and advances in the science and understanding of climate change, Edmonds City Council passed Resolution 1389, starting the process to produce this update to Edmonds' CAP. In 2018, consultants were hired to prepare a new GHG inventory and to advise the City on updating its Climate Action Plan.

Updating the Inventory

The first step in the updating the plan was to prepare a new inventory of "local" GHG emissions, using best available data and current inventory protocols. Local emissions means emissions that are generated within Edmonds or directly as a result of energy consumed in Edmonds. This allows the most direct comparison to the previous (2009) inventory. The inventory uses data from 2017, the most complete year of data available when the inventory was conducted in 2018. The updated inventory also incorporates "imported" emissions, those associated with goods purchased and consumed in Edmonds but that were produced elsewhere in the world. For example, the emissions associated with growing food in California and shipping it to Edmonds would be "imported" emissions, since they did not occur within Edmonds. Imported emissions are important to consider in personal lifestyle choices, but are difficult to estimate on a communitywide scale due to the lack of available data and the complexity of accounting for them.

While the inventory of 2017 emissions showed a slight increase in communitywide GHG, a direct comparison of inventories could not be made because of changes in the inventory protocols since 2009. Results of the GHG inventory are summarized in Section 4 of the CAP, and the full inventory is included in Appendix A.

Setting a Science-Based Target

Advances in the scientific understanding of climate change have improved our ability to predict outcomes under various scenarios of global response to and mitigation for global warming. For example, we now can predict that an unmitigated global temperature increase would translate to summer temperatures in Edmonds that are 11°F higher than they were historically.

Better science has enabled better methods of targeting the level of response needed, referred to as science-based targets. See Appedix B for a fuller discussion of science-based targets.

A science-based climate target sets a rate of climate action[1] that is aligned with keeping average global temperature increases below a specified level (such as 2°C) compared to pre-industrial temperatures.[2] A science-based target is based on the physical characteristics of the earth's atmosphere and how atmospheric changes are expected to affect the biosphere. A science-based target represents an overarching global target that humanity can collectively work toward. Maintaining temperature increases below a 2°C threshold will allow the majority, but not all, of the global population to avoid the worst social, economic, and environmental effects of climate change.[3] A target of 2°C is considered the "guardrail" target by numerous international organizations, including the United Nations.[3] As a point of reference, the average temperature of the earth is approximately 1.2°C (2.0°F) higher[4] today than at the beginning of the Industrial Revolution. Figure 1 shows the GHG reduction paths necessary to achieve these various outcomes. See Appendix B for a memorandum on setting a science-based target for the City of Edmonds.

In 2020, the Edmonds City Council adopted a science-based target of 1.5°C with Resolution 1453. This is the aspirational target set in the Paris Agreement and would substantially reduce many

1 Climate actions include reducing fossil fuel and other man-made sources of GHG emissions, as well as implementing negative emissions strategies. Negative emissions strategies provide more time to decarbonize.

2 A 2°C target is roughly aligned with an atmospheric carbon dioxide concentration of 450 parts per million (ppm).

3 United Nations Intergovernmental Panel on Climate Change, Fifth Assessment Report (IPCC AR5).

4 World Meteorological Organization Press Release: Provisional WMO Statement on the Status of the Global Climate in 2016.

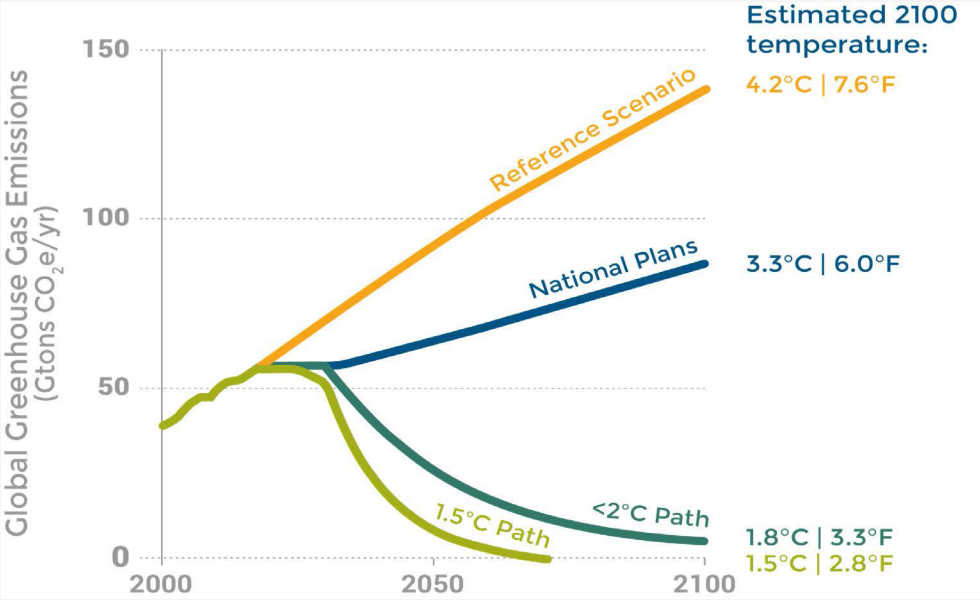

Figure 1: Estimated increase in global temperature based on UN forecast modeling.

of the worst potential effects that would occur if warming is allowed to rise by 2°C. Achieving the 1.5°C target means eliminating or offsetting all GHG emissions by 2050. Setting this target allows Edmonds to compare its progress to a fixed and measurable goal over the coming decades.

Assessing Edmonds' Policies

The City and community of Edmonds have been working toward many goals that will reduce or limit the growth of GHG emissions. Some of these goals were set because of climate change, while others were set because of other priorities, like housing affordability, resource conservation, and maintaining a high quality of life in Edmonds. Many of these goals are being implemented by incremental changes that will take decades to have a measurable effect. As part of this CAP Update, the City's consultants reviewed climate action plans of 21 other cities and tabulated almost 300 policies and strategies that will help Edmonds meet its GHG emissions target.

The consultants also developed a GHG tracking tool, a spreadsheet to create projections of GHG emission reductions, and the ability to adjust assumptions about the success of some of the most effective strategies. This tool helps to understand what the most effective strategies for Edmonds would be, and will allow periodic updates on progress toward these benchmark strategies, without the need to complete a full GHG inventory.

A baseline or "business-as-usual" (BAU) assumption of the GHG tracking tool is that GHG emissions will grow in direct proportion to population and employment growth in Edmonds (Figure 2). An adjusted BAU baseline takes into account the effects expected from various state and federal regulations that are designed to reduce future energy consumption and fossil fuel use in energy production, compared to past patterns. This includes stricter federal vehicle fuel mileage standards and state requirements for renewable electrical energy. Enacted in 2019, Washington State's Clean Energy Transformation Act requires electricity to become carbon-neutral and eventually carbon-free over the next 25 years. That means that a substantial portion of Edmonds' annual carbon footprint will be eliminated, putting the target of carbon-neutrality by 2050 within reach.

The initial iteration of the GHG tracking tool showed how much of a gap there could be between the science-based target and what could be achieved with the strategies that are already part of Edmonds plans.

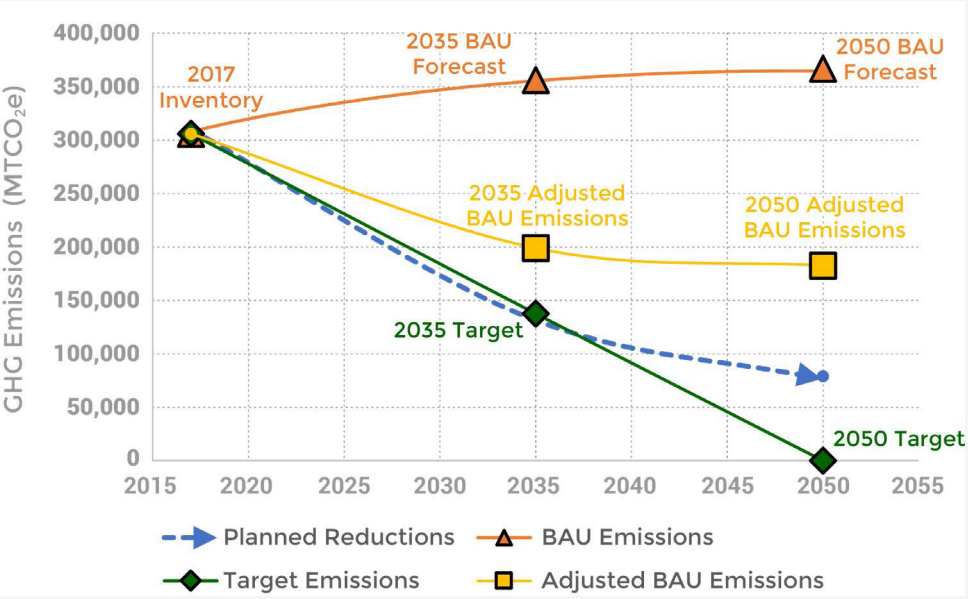

Figure 2: Emissions Comparison: BAU Forecast, Target Emissions, and Planned Reductions

What is a carbon footprint?

The GHG emissions associated with a particular entity (individual, household, business, or community) are sometimes referred to as a "carbon footprint." A carbon footprint usually refers to emissions during a specific time period, such as a year.

Public Outreach

Throughout the process of this CAP Update, the Mayor and City staff have sought input from the Mayor's Climate Protection Committee, and briefed the City Council. An open house was held in early 2019 to present results of the inventory and take input on strategies the City should consider in the future. The inventory was posted on the City website to allow citizen review. The City's consultants also prepared a paper on what other similar cities are doing to reduce their communitywide GHG emissions.

In late 2020 and early 2021, the gap revealed in the initial iteration of the GHG tracking tool was shared with the community. The City wanted to hear how Edmonds residents feel about the effects of climate change, and how they want to address the gap.

Edmonds residents were invited to provide input on priorities and new strategies through a workshop conducted online in March 2021, and through a survey that was distributed both online and through a random mailing. The results of the survey and workshop are included in Appendix C.

The survey results indicate that a solid majority of Edmonds residents consider the effects of climate change to be concerning, with the highest concerns being wildfire threat, threat to species and habitat, and decreased air quality. One concern that emerged from the workshop feedback was about social equity, recognizing that the effects of climate change fall disproportionately on people of limited means. As a result, a new section on equity has been added to the CAP.

In 2022, the plan was refined and presented again to the community in two workshops. Public comment on the strategies and actions has been considered and incorporated into the current plan – see Appendix C for a summary of the comments received. Among the comments received were questions about the cost of taking the proposed actions to address climate change. The plan does not include an estimate of implementation costs to the City or to its residents and businesses, nor does it estimate the cost to its residents and businesses of inaction. Any program that requires funding through the City would require budget approval, and costs will be considered at

that time. Similarly, regulatory actions considered under this plan could have short- and long-term cost implications, and those will be considered. What this plan does recognize is that the global cost of doing nothing to address human-caused climate change is likely to be greater than the cost of taking action to limit climate action.

Mitigation and Adaptation

Climate change is a dynamic process in which effects from the past two centuries of carbon emissions will be felt for decades to come. Efforts to reduce or limit these effects by eliminating sources of GHG emissions are broadly categorized as mitigation. This includes steps like switching to electric vehicles or reducing energy used for heating. Changes made in response to the effects of climate change are considered adaptation. This includes steps like ensuring the stormwater system is capable of handling more intense storms and will operate even with sea level rise. Adaptation to climate change will be needed, even under the best-case scenarios of GHG emission elimination. Mitigation measures address the underlying problem of climate change by slowing or stopping the rise in emissions. Adaptation is needed to help people and governments withstand and minimize the ravages of climate change that are already here or will be soon.

In the sections that follow, actions are identified with the following symbols that indicate the relative degree of effectiveness of the action at reducing GHG emissions.



Some measures may be highly effective but the City may have limited influence over them, such as those dependent on state or federal legislation. Other measures are much more within the City's influence, such as zoning or local infrastructure planning. Both types are included because some important steps can only be accomplished through state or federal action. In some cases, voluntary actions by individuals on a large scale, such as the choice of what car to purchase.

A battle on two fronts

Imagine you are in a boat that has sprung a leak. To address the source of the problem means plugging the hole. But to avoid being swamped, you need to start bailing. Both issues need attention simultaneously.

In the face of climate change, humanity must similarly act on two fronts at the same time — mitigation and adaptation.

What is in this Plan

This plan focuses on the most important steps Edmonds can take to address climate change. It begins with a section on equity because addressing climate change (or not doing so) has widely varying implications for individuals of different socio-economic backgrounds. The equity section sets the stage for how we move forward together. The next section summarizes the GHG inventory to provide a sense of the scale of the problem of GHG emissions, and where they come from. The CAP then lays out a set of strategies for addressing climate change, along with specifics for how those strategies will be pursued. Sections on Buildings and Energy, Transportation and Land Use, and Lifestyle and Consumption primarily focus on mitigation — ways the City will work to reduce GHG emissions. The section on Environment adds strategies to ensure the City is prepared to adapt to climate change. Within each of these sections, the CAP describes why that element is important, what the City has done to date, and what is planned for the future.

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Summary of GHG Inventory Update

This is a brief summary of a community-wide GHG inventory, which is presented in Appendix A. The inventory was conducted by a consultant team consisting of Environmental Science Associates and Good Company. The inventory was completed in early 2019 (referred to in this document as the 2019 inventory) based on data for 2017, the latest year for which complete information was available, using the Global Protocol for Community-Scale Greenhouse Gas Inventories 1.1 (GPC 1.1).[1] The City produced one previous inventory in 2009 (referred to as the 2009 inventory), using an earlier protocol and based on data from 2000 and 2005. The 2009 inventory was included in the 2010 CAP.

Edmonds' 2017 GHG emissions were estimated to be about 750,000 MT CO2e, including both "local" and "imported" emissions (Figure 5). "Local" emissions are those that occur within the city limits, plus emissions that result from electricity consumption within the city limits. "Imported" emissions are generated outside of Edmonds to produce the goods, food, and services consumed in Edmonds, or by the people of Edmonds while traveling outside of the city, such as air travel. Total local and imported emissions in 2017 were approximately 17.2 MT CO2e per capita. For comparison, in 2017 the global per capita average was 6.4 MT CO2e and the US average was 17.3 MT CO2e[2].

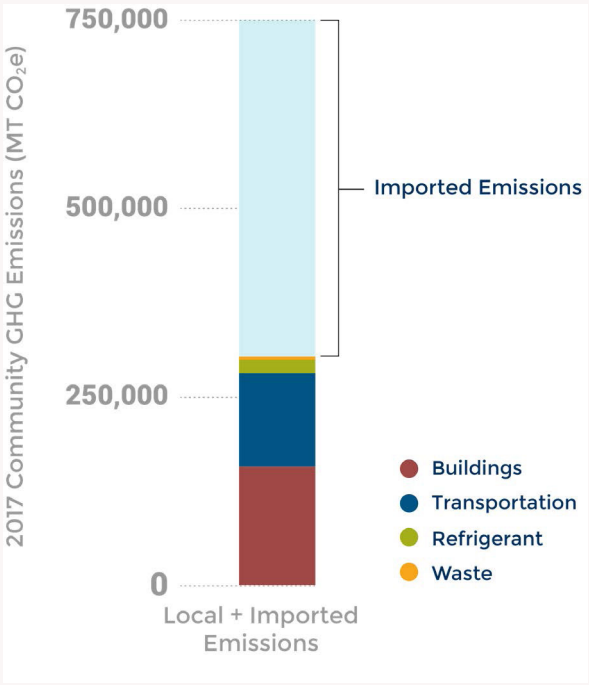

Figure 3: Local plus imported emissions in Edmonds in 2017

1 World Resources Institute et al. 2021.

2 Climate Watch. 2021. Historical GHG Emissions.

Local emissions in 2017 totaled about 306,000 MT CO2e (Figure 6), an increase in overall emissions since 2000. This represents 7.2 MT CO2e per Edmonds resident, a per capita rate that is essentially unchanged since 2000. However, GHG inventory protocols have changed since the previous inventory was completed (see Appendix A for further detail). Under GPC 1.1, the protocol used in this CAP Update, several new categories of GHGs were included, which increased the estimate of overall emissions. The largest of these new categories is fugitive refrigerant emissions - leaked extremely potent greenhouse gases used in refrigeration.

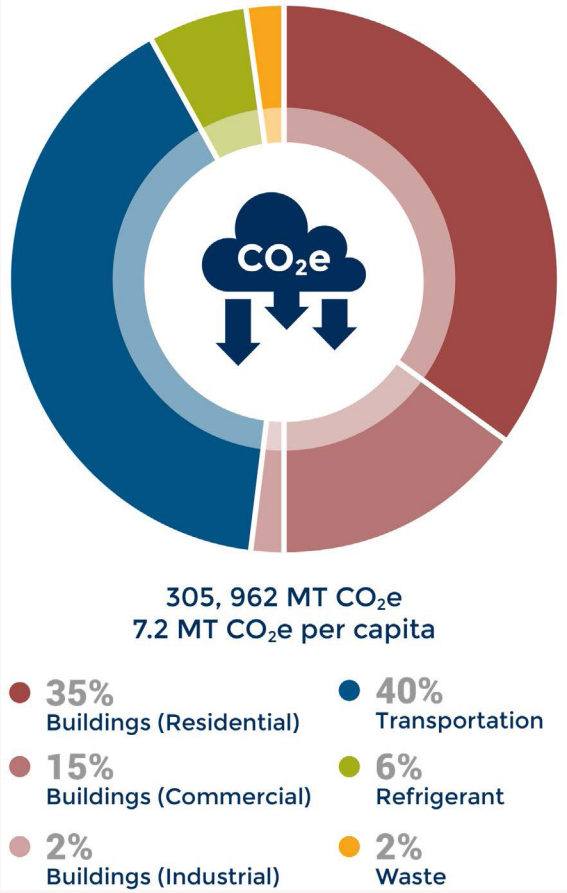

Figure 4: Local Emissions in Edmonds in 2017

As shown in Figure 6, emissions from operating buildings and transportation continue to be the two sectors with the largest local emissions sectors. Other key observations from the new inventory include:

- Residential buildings in Edmonds have more than double the impact of commercial buildings. In 2017, 65% of electricity was consumed in residential buildings, 29% in commercial, and 6% in industrial.
- In 2017, 75% of natural gas was consumed by the residential sector, nearly 25% by the commercial sector, and less than 1% was consumed by the industrial sector.
- Passenger transport, primarily in cars, is the leading source of transportation-related local GHG emissions.

Imported emissions in 2017 were estimated at 444,000 MT CO2e, 44% more than Edmonds' local emissions (see the light blue stack in Figure 5). Imported emissions are not required reporting in the GPC 1.1 protocol, due to accuracy limitations. However, the scale of consumption-based emissions is large enough to warrant inclusion in community climate action plans.

Households with larger annual incomes typically consume more and therefore generate more imported GHG emissions than households with smaller incomes. For example, GHG emissions from material goods for a household with an income above $120,000 are typically double that of a household with an income of $10,000–40,000. Edmonds' imported emissions are equivalent to the annual emissions of about 95,000 passenger vehicles, or the carbon sequestered annually by over 500,000 acres of average forest in the United States – a land area about 40 times the size of the City of Edmonds.

Comparison to the Previous Inventory

In the City's previous inventory (covering the years 2000 and 2005), only local emissions were considered, so those are the only emissions that can be compared with the inventory prepared as part of this CAP Update. The following general conclusions can be drawn from comparing the past inventory years with the 2017 inventory:

- In 2017, Edmonds had not reduced its local GHG emissions in accordance with the targets listed in the 2010 CAP. Total emissions rose since 2000, and per capita emissions have remained essentially the same, while the CAP aimed to reduce emissions substantially by 2017.
- The current protocol requires the use of a higher GHG emission factor (termed **Carbon Intensity**) for electricity than was used in the 2009 inventory, based on characteristics of the regional electricity grid (see Appendix A). By instead using the local Carbon Intensity factor for electricity supplied by the Snohomish County Public Utility District (SnoPUD), the inventory substantially reduced the GHG emissions from electricity.
- GHG emissions from electricity consumption decreased 7% between 2000 and 2017, reflecting greater energy efficiency and conservation.
- Natural gas use rose 25%, a higher rate than population and employment growth since 2000, and rose particularly among commercial users. This could mean that some of the overall reduction in electricity consumption was due to conversion to natural gas use, rather than energy conservation.

- The largest driver increasing Edmonds' emissions is on-road transportation, which increased 27% between 2000 and 2017.
- Vehicle miles traveled (VMT), a measure used to develop an estimate of the GHG emissions from transportation, cannot be estimated for the Edmonds community with high accuracy using existing data, and is generally assumed to be similar throughout Snohomish County on a per capita basis. As a result, GHG emissions increased not only due to Edmonds' population increase, but also because VMT per capita in the county rose from 2000 to 2017.

See the full inventory in Appendix A for further detail.

At best, due to data limitations, a GHG inventory prepared at a community scale provides a rough estimate of the community's emissions. The inventory follows a globally accepted protocol and provides sufficiently accurate information to assess the scale of emissions from various sectors, which is valuable in setting strategies and priorities for reducing GHG emissions. Improved inventory protocols and recordkeeping should make future inventories more accurate and allow for more precise tracking of progress as well as comparisons over time.

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Equity

This chapter focuses on **frontline communities**, how they may experience climate change, their role in addressing climate change, and **climate equity**.

Frontline communities are those most likely to be affected by climate change. Frontline communities are also often more resource efficient than the general population, with lifestyles that help achieve the community's climate action goals. They often live in higher density housing, consume less energy per capita, and rely on public transit. However, intersecting vulnerabilities and socioeconomic determinants such as preexisting health conditions, physical location, historic marginalization, social context, and income stability can make these communities more susceptible to threats of climate change. For example, elderly people and people who perform outdoor labor may be more vulnerable to changes in climate and environmental conditions. Frontline communities may include the elderly; low-income households; undocumented immigrants; Black, Indigenous, and People of Color (BIPOC) communities; speakers with limited English proficiency; individuals experiencing homelessness; those already suffering from chronic diseases; and others.

Frontline Communities as Stewards

Frontline communities are stewards in the conversation around climate change. Due to limited resources, limited mobility, and other factors, frontline communities often have a smaller carbon footprint and are also the first to explore ways to adapt to climate change. An elderly person on a limited fixed income learns to conserve resources, consume less, and find ways of enjoying life that fit within their resources. An immigrant family facing high housing and childcare costs may expand their household to include multiple generations, sharing housing costs and family duties. These types of adaptations may not be motivated by a concern about climate change, but they do have lower carbon emissions through limited household consumption and reduced vehicular trips. Frontline communities can be a source of innovation and expertise on how to make resources go further.

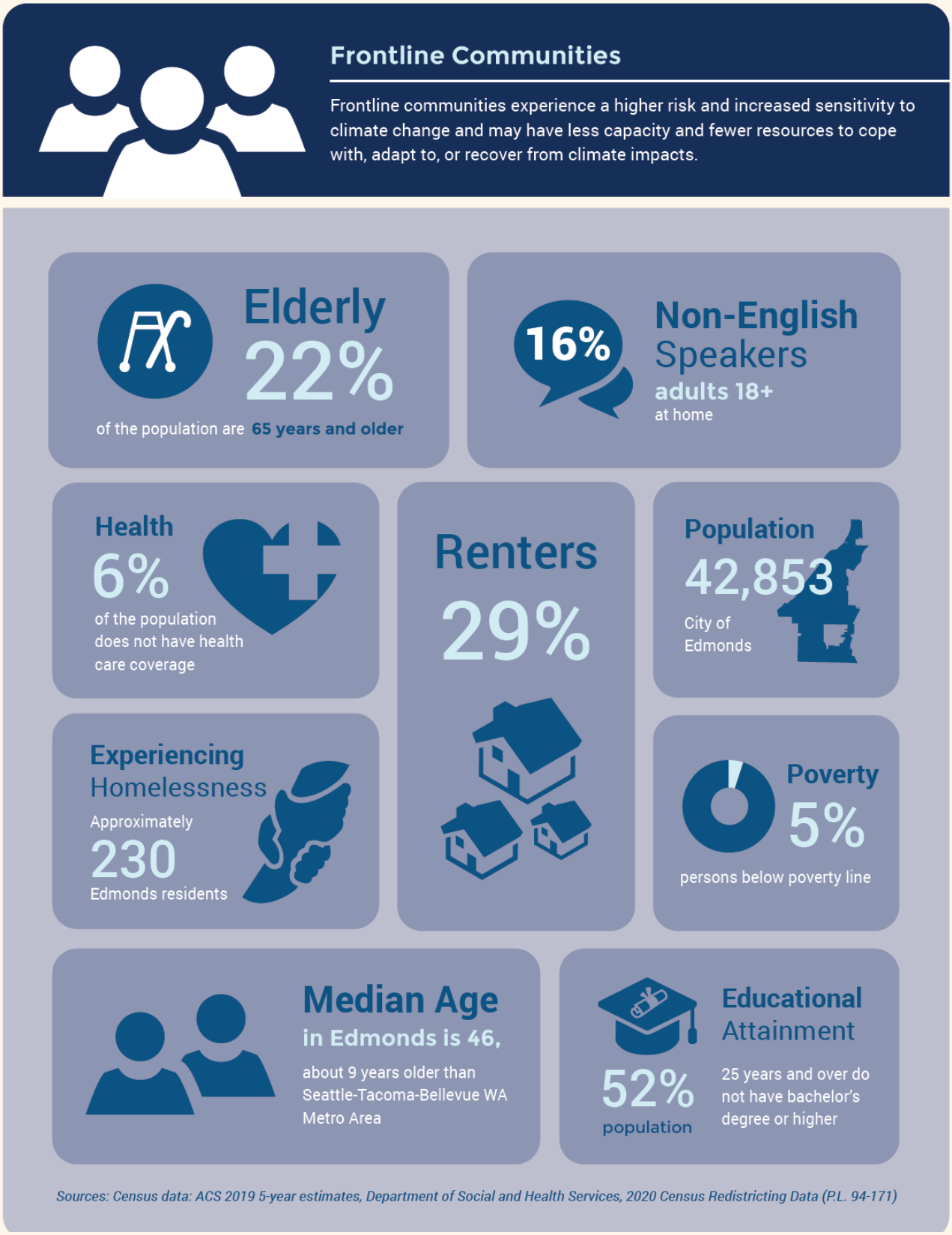

Figure 5: Frontline Communities in Edmonds
The City of Edmonds is home to frontline communities including the elderly, BIPOC, non-English speakers, those with no health care coverage, renters, persons below the poverty line, those experiencing homelessness, and those without a bachelor's degree or higher, among others.

Institutional Racism and Environmental Justice

Historically, discrimination against BIPOC communities has led to geographic segregation that reinforced and exacerbated economic, social, and environmental inequities. Like many suburban communities in the Puget Sound region, Edmonds grew rapidly during a period when banking and real estate practices openly discriminated against non-white people. Reinforced by federal policy established in the 1930s, "red-lining" limited the availability of home loans in neighborhoods with high concentration of BIPOC people, thereby constricting the ability of BIPOC people to accumulate wealth. These neighborhoods were also considered appropriate places for polluting industries, resulting in elevated exposure to pollutants by residents of these areas. At the same time, it was common practice not to offer property in white neighborhoods for sale or rent to BIPOC people. Often this was reinforced by property covenants, and in some cases by local law. Racially discriminatory covenants were determined unconstitutional by the US Supreme Court in 1948, and any form of housing discrimination based on race or ethnicity has been illegal in the United States since the Fair Housing Act of 1968.[1] However, openly discriminatory practices continued into the 1970s, and studies have shown that BIPOC individuals are still discriminated against in the housing market.[2]

Because Edmonds was a suburban city that grew by more than tenfold in the period from 1930 to 1980, its racial makeup was profoundly affected by these conditions. As a result, Edmonds' population is approximately 75% non-Hispanic white, higher than both the county and state averages.[3] Even within Edmonds, BIPOC population varies widely among different census tracts. Because of the effects of historic racism, this also means that some areas have concentrations of people with less wealth, which can limit options for housing, education, mobility, and employment.

In addition, Edmonds is on the traditional lands of the Coast Salish Peoples who still live here and throughout the region, and whose ancestors resided in this region since time immemorial. Despite treaties intended to protect their access to the resources they depend on, both racism and environmental degradation diminished their access to those resources. Climate change will further impact the daily activities and longstanding traditions of the region's Indigenous communities. It is imperative to meaningfully include those communities in climate change conversations and solutions.

Edmonds' responsibility for frontline communities is rooted in its history and in the community's longstanding commitment to all its residents. Given this history, special attention needs to be given to how climate adaptation strategies affect financial equity and ability to build intergenerational wealth within frontline communities.

Climate Equity in Edmonds

There are numerous ways in which environmental justice intersects with climate change and equity. This section outlines a few of the issues that Edmonds faces. A fuller assessment is one of the actions called for in the Climate Action Plan.

Edmonds has distinct neighborhoods including the Bowl, the Highway 99 Corridor, and others. The Bowl encompasses the waterfront, a downtown business district, and the ferry terminal. The Highway 99 Corridor is a commercial center for Edmonds and includes the Health, International, and Gateway Districts along a 2-mile stretch of Washington State Route 99 (SR-99). Geographic and socioeconomic factors create unique exposures and outcomes in each of these areas. For example, the Bowl experiences cooler temperatures than along SR 99 during hot weather events due to proximity to Puget Sound. Communities along the Highway 99 Corridor generally experience greater vulnerability to environmental health disparities than other parts of Edmonds. There is also a large population of people

1 Snohomish County. 2019. Analysis of Impediments to Fair Housing Choice.

2 Reardon. 2015. Neighborhood Income Composition by Race and Income, 1990-2009.

3 US Census. 2021.

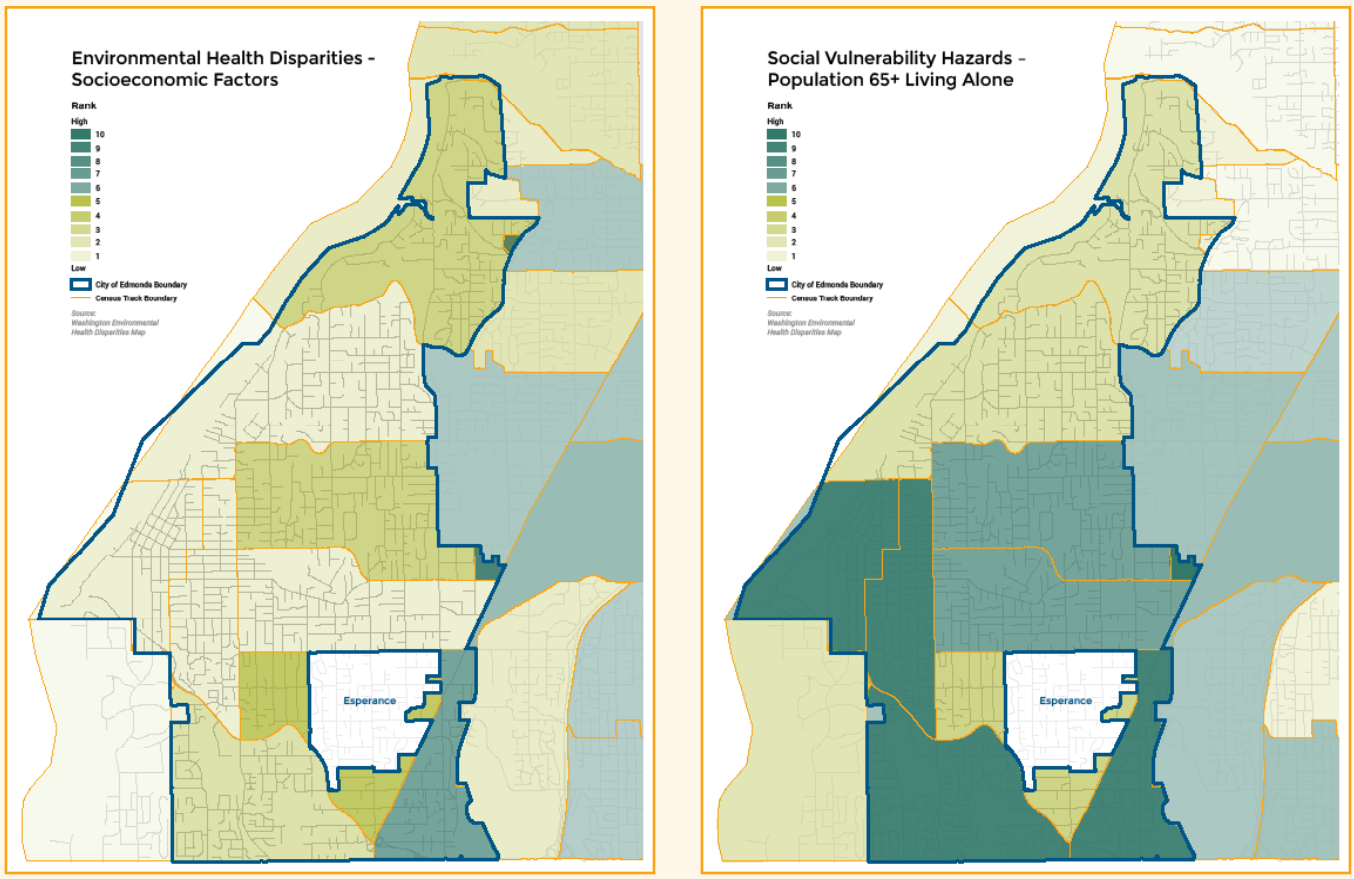

Figure 6. Environmental Health Disparities and Elderly Population in Edmonds, WA
The Washington Environmental Health Disparities Map shows higher vulnerability to environmental health disparities based on socioeconomic factors along SR 99 (socioeconomic factors include limited English, no high school diploma, people of color, population living in poverty, transportation expense, unaffordable housing, and unemployed), while age and housing situation (e.g., solo dwellers) drive high vulnerability rankings for residents living throughout Edmonds and in the Bowl

(Source: US Census Bureau, ACS 2019 5-year estimates). Esperance, a 0.7 square-mile part of unincorporated Snohomish County, is not reflected in these data.

65 and older living alone in both the Highway 99 Corridor and the Bowl, as illustrated in Figure 4. The unique contexts and frontline communities that exist within Edmonds need to be considered in the assessment and prioritization of climate change resources.

Other issues where climate change and environmental equity intersect include tree canopy, open space, air pollution, and safe streets.

Tree canopy varies throughout Edmonds. Areas with less canopy tend to develop "heat island" effects due to less shade, making these areas more vulnerable to higher summer temperatures. Trees also help to reduce air pollutants within a local microclimate. In some areas, the lack of tree canopy has been the result of a lack of public investment in street trees and open space.

Open space not only provides places for trees but also for exercise, respite, and community gardens. Especially in areas with higher density housing, public open space is an important component of public health. Frontline communities especially can benefit from investment in open space when it is designed to serve the needs of those communities, and those investments can also help Edmonds reach its climate goals. For example, community gardens

provide a place where people can grow food that not only keeps their cost of living down but also reduces the greenhouse gas emissions from food imported from outside the city.

Air pollution, while not an issue in much of Edmonds due to ample air movement, can be an issue in areas with a high concentration of vehicular and especially truck traffic, like the Highway 99 Corridor. Supporting the conversion to electric vehicles will benefit frontline communities in these areas, and there may be other measures the City can take to reduce exposure to pollutants in dense neighborhoods, such as limiting idling.

Safe streets are another component of resilient communities. Many of the actions in the Climate Action Plan focus on reducing vehicle miles traveled as a means to reduce GHG emissions. For those strategies to work, alternative modes of travel must be available, especially for the areas where most of Edmonds growth is expected to go, in centers identified in the Comprehensive Plan. However, many of the centers do not have streets complete with safe places to walk or bicycle, especially those near Highway 99. Historically, the areas with the least developed street infrastructure have also been where lower cost multifamily development has occurred. By listening to and addressing the needs of frontline communities in these areas, the city can help to reach its climate action goals in a manner that reduces some of these past inequities.

Centering equity

Centering equity means ensuring that people who will experience the brunt of climate impacts are actively engaged in and providing leadership to efforts that identify and prioritize vulnerabilities and develop solutions to address those vulnerabilities. The City of Edmonds has been working to integrate equity considerations into planning, demonstrated by the formation of a Diversity Commission in 2015 and the Mayor's Equity and Social Justice Task Force in 2020, as well as other planning goals, such as the city's long-term vision to offer affordable housing with walking and transit access.[4]

Some community improvements in response to climate change may lead to unintended effects, such as exacerbating displacement and gentrification. Therefore, in considering future climate programs, plans, and policies, it will be important for the City of Edmonds to apply an equity lens, and to guard against maladaptive practices.

Public participation for the climate action process in 2021 included a virtual open house and community workshops, accompanied by a survey to provide feedback on current proposed strategies and recommend potential new ones. Feedback from this outreach included suggestions that the City should consider equity in its efforts to address climate change, including helping those who could least afford to adapt to the effects of climate change. As a result, this section has been added to the CAP Update. Community involvement will continue to play an integral role in climate planning in Edmonds.

An equity lens may include analysis by asking questions such as: Who is most affected by decisions, and therefore should be at the table? Who is not at the table? How can they be included? Is there a diverse representation from a range of lived experience on project teams and in decision-making roles? Who benefits from the project, program, or policy? Who is adversely impacted? Are the voices of frontline communities being heard, and is their input being considered?

4 City of Edmonds. 2020. City of Edmonds 2020 Comprehensive Plan)

Co-benefits of climate equity strategies

Many of the actions that address climate change can improve the health and wellbeing of frontline communities. For example, retrofitting homes for energy efficiency can help low-income households reduce their utility payments and experience greater safety during extreme weather events, with the co-benefit of reducing greenhouse gas emissions. Other common co-benefits of adaptation strategies are related to health, financial stability, education, improved mobility, and support of businesses. Integrating climate change into permitting and land use planning can result in benefits such as mixed and joint open space-affordable housing developments, and expanding access to local food sources.

By instituting measures to deal with climate impacts, Edmonds can plan for climate change in a way that protects frontline communities and provides an equitable distribution of costs, benefits, and opportunities for all members of the community. By investing in skilled workers, green workforce development training, and new low carbon technologies like clean energy and renewable materials, Edmonds can support new engines for green job growth and sustainable economic prosperity.

In partnership with other public agencies and community-based organizations, the City of Edmonds has an important role to alleviate historic disparities, educate and engage the public on climate change issues, and to promote community involvement in actions to reduce climate change risks. In the strategies described in this plan, some of the most obvious equity issues are mentioned. As the City of Edmonds updates its comprehensive plan and develops new initiatives to address climate change, we will continue to center equity comprehensively and and take meaningful steps to address the issues surrounding climate change.

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Buildings and Energy

The Problem, Strategy, and Benefits:

Energy used in the occupancy and operation of buildings is the largest source of local GHG emissions in Edmonds (Figure 7). Because Edmonds is largely residential, residential buildings emit roughly twice the quantity of GHGs that commercial and industrial buildings in Edmonds emit.

Building emissions are about equally split between natural gas and electricity, although a small portion of homes are also heated with heating oil. At present, most electricity in Washington is generated through hydropower, wind, nuclear, and solar, sources that have very low GHG emissions. Snohomish PUD, which provides Edmonds with electricity, obtains over 95% of its electricity from carbon-free sources and is on track to achieving 100%.[1] As discussed in more detail in the GHG inventory (Appendix A), some electricity on the regional grid comes from either coal or natural gas generation equipment, with the latter being important especially for peak demand periods. The Clean Energy Transformation Act (CETA), passed in 2019 by the Washington legislature, requires all electricity to be carbon neutral by 2030, and carbon-free by 2045. This will eventually drive down GHG emissions from buildings significantly, especially from those heated by electricity, but fossil fueled heating, cooking, and hot water will continue to be a substantial source of emissions unless further action is taken.

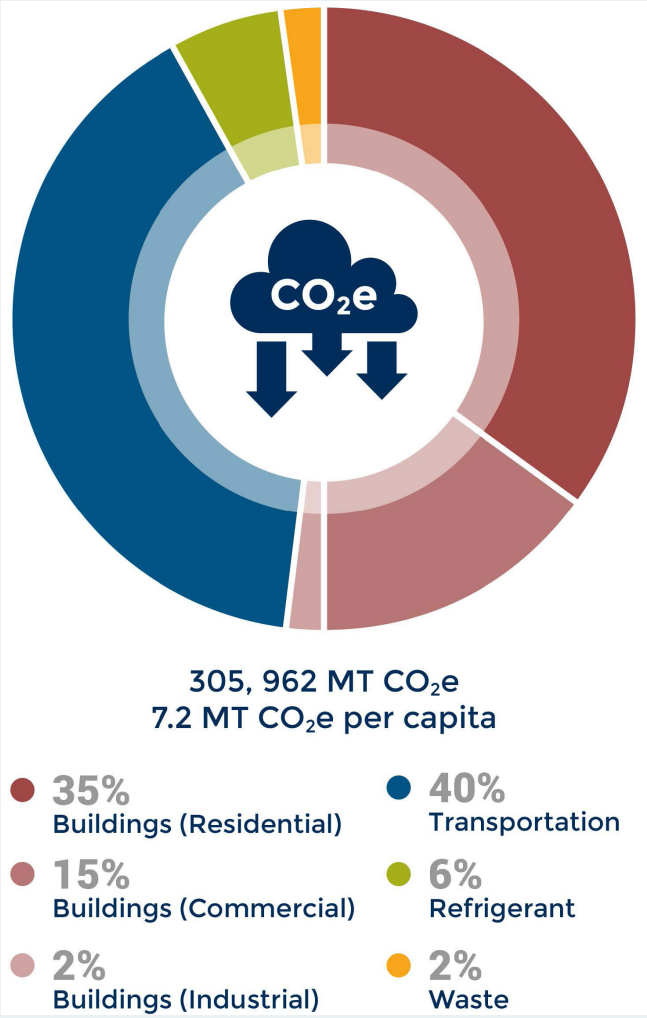

Figure 7: 2017 Local GHG Emissions in Edmonds, WA

1 SnoPUD. 2021. Final 2021 Clean Energy Implementation Plan.

While electrical consumption in Edmonds declined by 7% from 2000 to 2017, natural gas consumption rose by 25%. Efforts to conserve electricity remain important, but reducing fossil fuel use must be a key area of focus to reach the ultimate goal of net-zero carbon emissions from buildings in Edmonds by 2050.

The main uses for carbon-based fuels in homes are heating and cooling (34% of total energy use), hot water (30%), and cooking (3%) (see Figure 8). In residential buildings and especially in detached homes, natural gas is the most common fuel used for heating and hot water.[2] It is also common for cooking and gas fireplaces. **For residential buildings, GHG reduction strategies that focus on homes using carbon-based fuels, and especially heating and hot water, will have the greatest effect.**

Net-zero Carbon Emissions

Refers to a target of completely negating the amount of GHGs produced by a specific human activity or facility, to be achieved by reducing emissions and implementing methods of absorbing carbon dioxide from the atmosphere.

Because housing is a basic need, considerations of social equity are important. Low-income urban households have an energy burden—the proportion of income spent on energy—three times higher than that of non-low-income households, due to lack of weatherization and older equipment.[3] For example, natural gas is less expensive for hot water production than a conventional hot water heater. Heating water with an electric heat pump cost less to operate, but the equipment is typically more expensive than natural gas hot water heaters. Although converting to a heat-pump hot-water system would reduce GHG emissions and energy bills, lower income households often cannot afford the initial expense. **Strategies that consider such equity issues will focus on helping those who are least able to afford to make the conversion that is needed to meet the goal.**

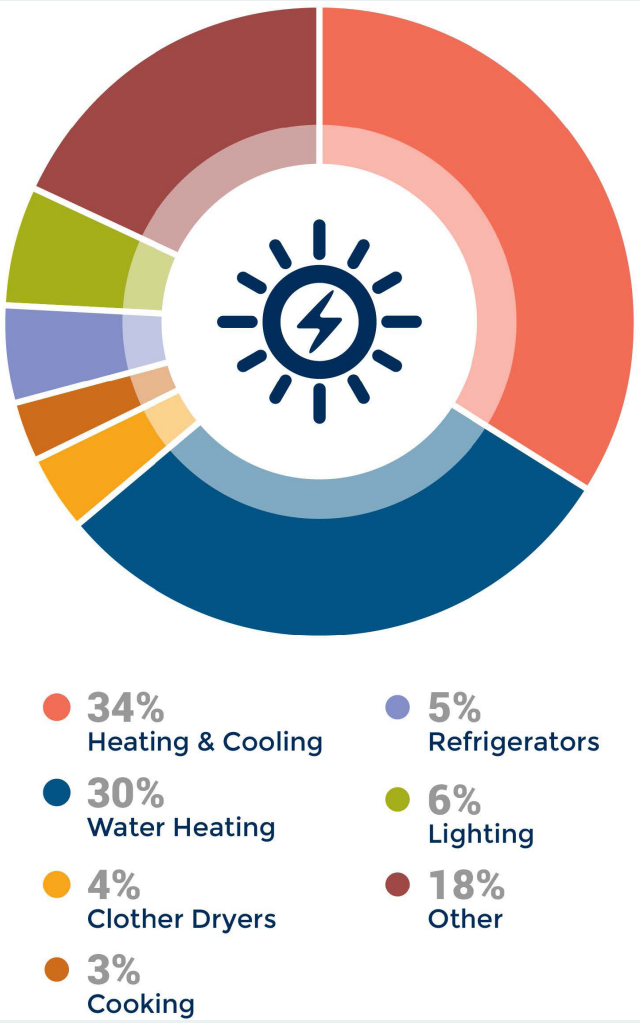

Figure 8: Residential energy use
Source: 2020 Biennial Energy Report, State of Oregon, December 2020

Similar to residential buildings, heating and hot water are major energy uses in commercial and institutional buildings. Some commercial operations have processes that also require carbon-based fuels. Determining what types of operations use carbon-based fuels and what can be done to reduce their GHG footprint can be complicated, but the basic needs of heating and hot water production are common to all. Restaurants often use natural gas for cooking and in some cases for heating outdoor eating areas. As with residences, there are many

2 Oregon Department of Energy. 2020. Biennial Energy Report.

3 ACEEE. 2016. Lifting the High Energy Burden in America's Largest Cities.

small business owners for whom GHG reduction could be especially burdensome, and social equity consideration should be part of the discussion. Supporting businesses' efforts to become more energy efficient reinforces community resilience at the same time it reduces GHG emissions.

Puget Sound Energy (PSE) is also making efforts for its gas supply to be carbon neutral. PSE has begun experimenting with carbon neutral "renewable natural gas" and other sources to replace fossil fuel, and aims to sell carbon neutral natural gas by 2045. Unlike electric sources, however, there is no State mandate for natural gas at this time, and it is not clear how or if PSE will attain its stated goals. **Therefore, this CAP Update uses the conservative assumption that natural gas will continue to be predominantly fossil fuel, and takes the strategy of supporting statewide legislation similar to the Clean Energy Transformation Act (CETA) to reduce the carbon footprint of natural gas supplies.**

The City has taken steps to address these issues but more must be done to meet the target by 2050.

Renewable Natural Gas (RNG)

RNG is a pipeline-quality gas that is fully interchangeable with conventional natural gas. RNG is essentially biogas (the gaseous product of the decomposition of organic matter, such as wood or agricultural waste) that has been processed to purity standards.

What the City has already done:

- In 2007, became an ENERGY STAR partner with the EPA, employing the ENERGY STAR Portfolio Manager to track monthly consumption of energy use in 16 City-owned buildings.
- In April 2008, adopted Edmonds' Sustainable Building Policy (Council Resolution 1168). It established the LEED Silver standard, developed by the US Green Building Council, for new commercial or civic buildings of greater than 5,000 square feet and for renovation of existing structures when the increase in value amounts to more than 50% of assessed value. It also emphasized Life Cycle Cost Analysis.
- In 2009, adopted a "Sustainability Element" in the City's Comprehensive Plan that included a commitment to review building codes as they pertain to heat, insulation, and energy efficiency.
- Joined the Cascade Agenda as a member city and endorsed the Cascade Agenda principles of making the city "complete, compact, and connected."
- Completed an energy audit of major City buildings and facilities to identify opportunities for improved efficiency.
- Reduced electrical usage at the library by approximately 45% after completing a capital improvement project.

Since the last CAP was prepared (2010):

- Upgraded the wastewater treatment plant with new technology that reduced electrical consumption by 19% and fuel oil consumption by 44%, a reduction of 221 MT CO2e annually.
- The City purchased 36 energy use meters, which are available to residents and small business owners to check-out for a free two-week period.
- Upgraded energy efficiency of City facilities, including interior lighting, insulation, and 10kW of community solar at the Anderson Center; insulated glazing at City Hall; and high efficiency boiler and hot water tank at the Public Safety building.
- Worked with PUD to replace 1600 streetlights with energy-efficient LED fixtures.

Strategies and Actions:

Significant reductions in GHG emissions from buildings can be obtained by pursuing several practical measures that fall into three basic strategies:

Strategy BE-1: Replace Fossil Fuels used in Buildings with Renewable Energy Resources

With the passage of CETA, electricity will be carbon free by 2045; thus, any all-electric buildings will have eliminated their GHG emissions for energy. Conversion from fossil fuel to electricity will do the most to accomplish this strategy. This includes changing heating and hot water systems, including outdoor heating and lawn care equipment, and water conservation devices. Adding solar generation to buildings prior to 2030 will help speed this effort, and will add to community energy resilience through local generation of electricity.

Actions:

Buildings and Energy		Potential to Reduce GHGs	Degree of City Influence
BE-1 Replace Fossil Fuels Used in Existing Buildings with Renewable Energy Resources			
BE-1.1	Adopt appropriate zoning allowances to facilitate installation of renewable energy projects, energy storage, and efficient mechanical equipment, such as height and side setback or noise exceptions for heat pumps.		High
BE-1.2	Provide financial assistance programs such as low interest loans or grants for installation of solar energy projects and energy efficient equipment for affordable housing projects, including residences and community facilities.		High
BE-1.3	Promote electrification of heating and hot water for all small business spaces by 2035.		Low
BE-1.4	Promote electrification of all businesses, including heating, hot water, and cooking, by 2050.		Low
BE-1.5	Educate the homeowners, renters, apartment managers, and businesses on the efficiency and cost effectiveness of electric heat pump heating and hot water systems.		High
BE-1.6	Restrict or prohibit the use of fossil fuels for outdoor heating and landscaping equipment.		High

Strategy BE-2: Improve Energy Efficiency of Existing Buildings and Infrastructure

Energy consumption in buildings could be cut by about 30–50% through investment in energy efficiency. Up to 20% of US households have heating equipment that is more than 20 years old. Modern appliances and equipment with ENERGY STAR ratings can be as much as 80% more efficient than the equipment it replaces. Low-income urban households have an energy burden—the proportion of income spent on energy—three times higher than that of higher income households, partially due to lack of weatherization. Improved energy efficiency can lower living costs and improve the quality of housing, while also reducing GHG emissions. The City will continue to encourage energy efficiency upgrades in existing buildings.

The City already has programs aimed at reducing energy consumption at its wastewater treatment plant and reducing water consumption. **The City will also examine the feasibility of converting all City facilities to electric heating and hot water.**

The City will continue to promote energy-efficiency programs sponsored by the utilities and energy companies, including water conservation. To support PSE's efforts to reduce its carbon footprint, **the City will support statewide legislation to require natural gas supply systems to be carbon neutral**

Actions:

Buildings and Energy		Potential to Reduce GHGs	Degree of City Influence
BE-2: Improve Energy Efficiency of Existing Buildings and Infrastructure			
BE-2.1	Support legislation to require gas supply systems statewide to be carbon-neutral by 2045.		Low
BE-2.2	Create and implement a green building incentive program.		High
BE-2.3	Continue to improve energy efficiency of the City's wastewater treatment plant.		High

Strategy BE-3: Require the Design and Construction of New and Remodeled Buildings to Meet Green Building Standards

New commercial, mixed-use, and residential buildings will be built as redevelopment and in-fill development occurs and development, including within the Highway 99 and Westgate Mixed-use planning areas. Building to Leadership in Energy and Environmental Design (LEED) standards, and moving to all-electric and net-zero construction will significantly reduce resource consumption and the creation of waste in our dwellings and commercial buildings.

Actions:

Buildings and Energy		Potential to Reduce GHGs	Degree of City Influence on Outcome
BE-3: Require the Design and Construction of New and Remodeled Buildings to Meet Green Building Standards			
BE-3.1	Adopt regulations to require new multi-family and commercial buildings to use 100% electric heating, cooking, and hot water by 2023.		High
BE-3.2	Support changes to State building code to achieve net-zero energy consumption in new buildings by 2030, including requiring new single-family residences to be all electric.		High
BE-3.3	Require that all new multi-family residential and commercial buildings and any major commercial remodeling projects meet LEED Gold standards or equivalent for Commercial and LEED Silver or equivalent for multifamily.		Low
BE-3.4	Convert all City facilities to electric heat and hot water by 2035.		High

Metrics for tracking Building and

	2035 Target	2050 Target
Strategy BE-1: Replace Fossil Fuels used in Buildings with Renewable Energy Resources	430	700
Number of New Residential and Commercial Solar Photovoltaic Systems Installed		
Strategy BE-2: Improve Energy Efficiency of Existing Buildings and Infrastructure	18%	33%
Percent of Existing Residential and Commercial Area Retrofitted		
Strategy BE-3: Require the Design and Construction of New and Remodeled Buildings to Meet Green Building Standards	75%	100%
Percent of New Residential and Commercial Development LEED-Certified or meeting Net-Zero Carbon Emissions		

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Transportation and Land Use

The problem, strategy, and benefits

Transportation accounts for 40% of local GHG emissions in Edmonds—our second largest source (see Figure 5). Although the City of Edmonds has little control over traffic on our highways, fuel-efficiency standards, fuel taxes, or technological breakthroughs, choices that the City and community make regarding land use, use of electric or high-efficiency vehicles, and support for infrastructure all influence local GHG emissions from transportation.

Development in Edmonds is predominantly residential. As a result, most Edmonds residents commute outside of the city for employment, and the majority do much of their shopping outside of the city. In Edmonds, an estimated 80% of the GHG emissions from the transportation sector are from passenger vehicles (Figure 9). Approximately 71% of workers in Edmonds commuted in private vehicles in 2017, and over half had commutes of longer than 20 minutes.[1] By making more goods, services, and employment available within Edmonds, residents could reduce the need to travel for daily activities. This means encouraging commercial development in mixed-use urban centers such as downtown Edmonds, Westgate, and Five Corners.

Currently, transportation is heavily dependent on fossil fuels. A considerable amount of fossil fuel is also required to produce and deliver goods and services to residents of Edmonds – emissions that are not produced locally. In addition, as a relatively affluent community, Edmonds residents often use air travel for work and recreation, another source of GHGs not produced locally but attributable to

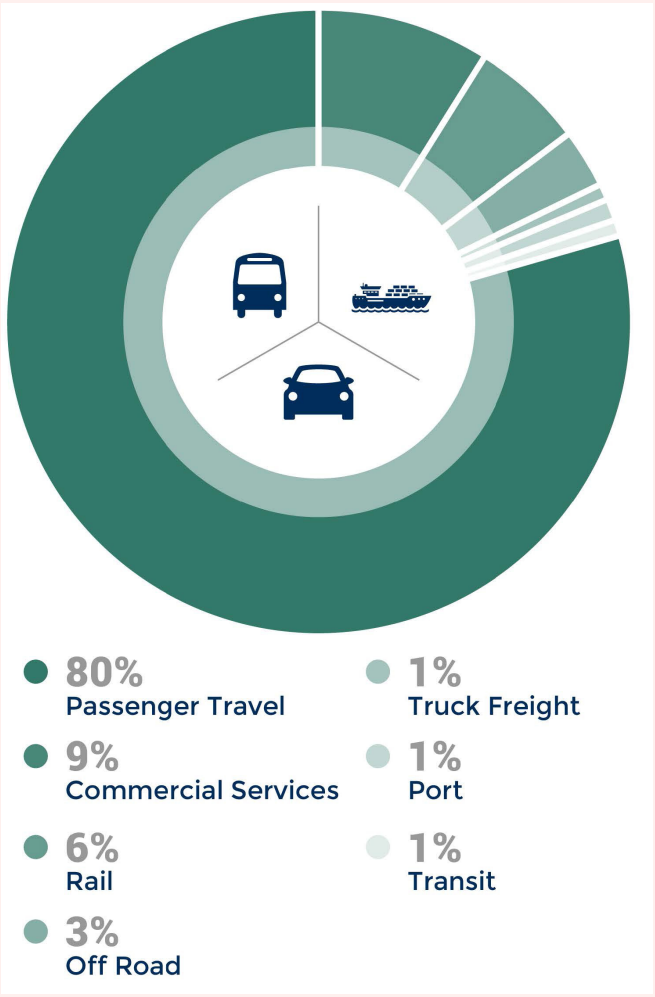

Figure 9: Distribution of local transportation emissions by vehicle category

1 2017 US Census Bureau.

our lifestyle. Figure 10 shows the sources of GHG emissions from various transportation modes, including these imported emissions.

Reducing GHG emissions from transportation can be accomplished by traveling in vehicles that use less fossil fuel per passenger mile travelled or by reducing the number of vehicle miles traveled (VMT).

Transit use generates fewer GHG emissions per passenger mile than using fossil fuel-powered private vehicles. Edmonds has access to bus and rail transit, but only about 9% of workers use transit to commute. Recent expansion of Bus Rapid Transit in the Highway 99 corridor and expanding Sound Transit light rail in the I-5 corridor will increase opportunities for transit use by Edmonds residents. Further improvement such as transit hubs, shuttles, "last-mile" services, ridership promotion, and electrification of transit vehicles can help reduce GHG emissions from transportation. In addition, electric vehicles and plug-in hybrid vehicles can replace use of fossil fuels with electricity, which, as discussed above, will soon be carbon neutral in Washington State, and eventually carbon-free.

Reducing the number of miles traveled can be accomplished by changes in land use patterns as well as by changes in work location and commuting habits. Land use patterns that provide housing close to shopping and employment reduce the distance to destinations and facilitate efficient transit use. Where there are safe and convenient routes, more people choose walking or riding a bicycle for short trips, such as shopping, travel to school, or visiting friends, as well as for regular commuting. Working from home, which has become much more common during the current pandemic, also reduces commute trips.

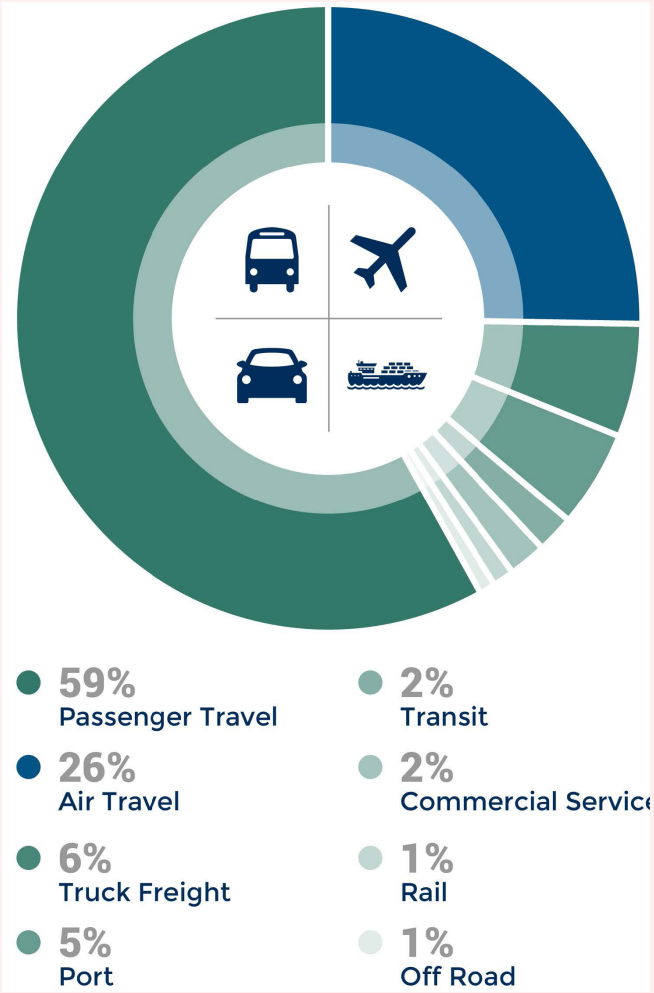

Figure 10: Distribution of local and imported transportation emissions by vehicle category

What the City has already done:

- Adopted a Transportation Plan that will add new sidewalks and bicycle routes.
- Converted all diesel trucks to biodiesel fuel.
- Provided transit and carpool incentives to City employees, including alternate work schedules and telecommuting opportunities.
- Supported the Swift Bus Rapid Transit plan.

Since the last CAP was prepared (2010):

- Adopted a Complete Streets Ordinance (Ordinance No. 3842) in June of 2011, resulting in 15 miles of new bike lanes, with 6 more miles planned for 2023.
- Reduced minimum parking standards in many commercial and residential zones.
- Created more flexible zoning standards encouraging mixed-use development.
- Added requirements for charging stations in new development.
- Installed public electric vehicle charging stations at 20 locations
- Upgraded the City vehicle fleet to 6 electric vehicles, 11 hybrid vehicles, 33 propane vehicles, and committed to 6 more electric and 8 more hybrid vehicles to the fleet in 2022.
- Updated City land-use rules to encourage more home-based business opportunities.
- Worked with Sound Transit to add commuter rail improvements.

Strategies and Actions:

Five strategies that are essential for reducing GHG from transportation include:

Strategy TR-1: Reduce VMT through Sustainable Land Use

One of the most effective ways the City of Edmonds can address emissions from transportation is through regulating how our city is developed, including the promotion of local businesses in mixed-use centers. Business hubs provide readily available and nearby goods, services, and employment for surrounding neighborhoods. This shortens travel distances and makes walking and biking more attractive. **Every unit of housing constructed in an urban center represents a reduction of approximately 1.5 MT CO2e annually, compared to the average home in Edmonds.** Edmonds has many attractive multi-family areas and has planned for nearly all its future growth to occur in these types of centers.

Actions:

Transportation and Land Use		Potential to Reduce GHGs	Degree of City Influence
TR-1: Reduce VMT through Sustainable Land Use			
TR-1.1	Adopt a multimodal level of service to enable complete streets outcomes.		High
TR-1.2	Develop code and guidelines and zoning that support mixed-use and transit-oriented (Highway 99 and downtown) development in neighborhood commercial centers to encourage close-to-home local shopping and employment opportunities.		High
TR-1.3	Provide tax or other incentives for low income or affordable housing projects in the City's activity centers.		High
TR-1.4	Encourage more businesses to locate in Edmonds by allowing commercial uses in more locations, permitting more intensive uses, or reducing parking requirements in areas well served by transit.		High

Current level of service standard establish aceptable levels of travel delay for vehicles using public roads. A multimodal level of service would establish similar threshholds for transit, walking, and biking.

Strategy TR-2: Reduce VMT by Improving Transit Systems

Edmonds is served by Community Transit buses and Sound Transit commuter rail. However, relatively few workers regularly commuted by transit in 2017. With the pandemic, travel patterns are changing. Community Transit already provides discounted fares to seniors, low income and youth riders. This strategy includes supporting increased transit service, efficiency, and reliability within Edmonds (e.g., to shopping, medical, schools, and recreation) and connections to regional transit, with the goal of greater transit use by commuters, residents and visitors, and an associated reduction in VMT.

Actions:

Transportation and Land Use	Potential to Reduce GHGs	Degree of City Influence
TR-2: Reduce VMT by Improving Transit Systems		
TR-2.1 Coordinate transit agencies to increase service within Edmonds and improve access to new light rail connections.		Moderate
TR-2.2 Preserve and expand Sounder commuter rail service in Edmonds.		Low
TR-2.3 Invest in transit stop amenities to improve transit ridership experience (e.g. shelters, benches, lighting).		Low

Strategy TR-3: Reduce VMT by Committing to a Complete Street Approach

Walking and biking do not generate GHGs. However, in many areas of Edmonds walkers and bikers do not feel safe because of the lack of separated and protected routes. **Improvements such as Safe Routes to School, additional and safer bike lanes, convenient bicycle parking, and more improved and extended sidewalks make it easier for people to choose these alternate modes.** Currently, only 2.4% of workers in Edmonds walk or bike to work. Every shift of mileage from gasoline-powered automobiles to non-motorized modes reduces GHG emissions, not only by reducing VMT, but also by reducing congestion and vehicle idling.

Actions:

Transportation and Land Use		Potential to Reduce GHGs	Degree of City Influence
TR-3: Reduce VMT by Promoting Active Transportation			
TR-3.1	Commit to installing one bicycle rack per block within neighborhood districts.		High
TR-3.2	Establish a complete streets process for capital projects and a complete streets steering committee to sign off on compete streets recommendation or exemptions.		High
TR-3.3	Develop a pedestrian priority investment network and triple funding in the Capital Improvements Plan.		High
TR-3.4	Adapt streets for people purposes periodically, such as "Walkable Weekends" to promote walking as a community activity that also supports local businesses.		High
TR-3.5	Require bike parking and e-bike charging in new commercial and multifamily.		High

Strategy TR-4: Reduce VMT through Vehicle Sharing and Flexible Work Requirements

Carpooling and vanpooling have been available options for commuters for decades, but have been utilized in Edmonds only on a limited basis. Flexible work schedules, such as working from home or having 4-day work weeks, have also been little utilized until the COVID-19 pandemic. Many office workers have switched at least temporarily to working from home either full time or part time, with the effect of reducing VMT for commuting. Since most working residents of Edmonds are employed outside of Edmonds, the City has little control or influence over working conditions or requirements, but through education and outreach may be able to help and encourage Edmonds residents to continue to use these types of commute trip reduction measures. The City can also facilitate carpooling at local employers by requiring that designated parking spaces be provided.

Actions:

Transportation and Land Use	Potential to Reduce GHGs	Degree of City Influence
TR-4: Reduce VMT through Vehicle Sharing and Flexible Work Requirements		
TR-4.1 Explore bike and scoot share programs Edmonds.		High
TR-4.2 Formalize hybrid work options for City employees.		High
TR-4.3 Explore opportunities to develop car share facilities (e.g., ZipCar, car2go, GIG, etc.) with ferry system.		Moderate
TR-4.4 Increase utilization of the city commute trip reduction program for employees.		Moderate

Strategy TR-5: Promote Low-Carbon Vehicles and Other Methods of Reducing Emissions from Vehicles

Fossil fuel-powered cars and trucks are the largest component of the GHG emissions from transportation in Edmonds. Conversion to electrically powered vehicles can eliminate or substantially reduce GHG emissions, and such adoption is accelerating, especially as many major manufacturers commit to phasing out fossil-fueled vehicles. As of December 2021 there were 745 battery-electric and 212 plug-in hybrid vehicles registered in Edmonds, an increase of nearly 144% since 2017, but still just over 2% of the vehicles. In Norway, electric vehicle sales rose from 1% to 65% in 10 years.[2] **The primary role the City can play is to help create the charging infrastructure needed in public places and in existing and new development.** The City can also continue to replace its own fleet, educate the public to better understand the technology, and support electrification of transit, ferries, and commercial transport. In addition, while many fossil-fueled vehicles remain in use, the City can reduce emissions through establishment of no-idling zones.

Actions:

Transportation and Land Use		Potential to Reduce GHGs	Degree of City Influence
TR-5: Promote Electric Vehicles and Other Low-Carbon Vehicles			
TR-5.1	Adopt standards for the placement of charging stations in public rights-of-way.		High
TR-5.2	Convert City fleet to electric vehicles.		High
TR-5.3	Add charging stations at all City facilities, including parks.		High
TR-5.4	Adopt a policy to limit vehicle idling, including the posting of appropriate signs at businesses and holding areas, such as school and ferry areas. This action would include evaluating how to equip City trucks with auxiliary electrical systems for illumination and warning signs.		Low
TR-5.5	Support the long-term plan for electrifying the Washington State ferry fleet.		Low

2 Time Magazine 2022. *What Norway Can Teach the World About Switching to Electric Vehicles.* January 7, 2022.

Metric: Transportation and Land Use

	2035 Target	2050 Target
Strategy TR-1: Reduce VMT through Sustainable Land Use	3,000	5,400
Residential units developed in centers		
Strategy TR-2: Reduce VMT by Improving Transit Systems	20%	30%
Percent of workforce commuting by transit		
Strategy TR-3: Reduce VMT by Promoting Active Transportation	5%	12%
Percent of workforce commuting on foot or by bicycle		

	2035 Target	2050 Target
Strategy TR-4A: Promote ridesharing	15%	25%
Percent of Workers Carpooling and Ridesharing		
Strategy TR-4B: Promote flexible work requirements	15%	25%
Percent of workers with alternate work week or work at home		
Strategy TR-5: Promote Electric Vehicles and Other Low-Carbon Vehicles	19,000	51,800
Number of electric vehicles registered in Edmonds		

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Environment

The problem, strategy, and benefits:

Climate action also includes preparing for and adapting to climate change. Our environment, consisting of both natural systems and the built environment, is being affected by climate change in numerous ways, some of which we understand very clearly, and some we are only beginning to understand. At a global scale, these include:

- Changes in temperature and precipitation that affect the supply of water and food for hundreds of millions of people.[1]
- Flooding and inundation due to sea level rise that affect nearly every coastal community in the world, inundating the residences of millions of people, most of whom live in cities, as well as changing patterns of coastal erosion.[2]
- Ocean acidification, reduced polar ice, and other climate shifts that are reducing the range of habitats for numerous plant and animal species, and inducing the migration of many species.[3]

Edmonds, although small, contributes to these impacts through GHG emissions. Through outreach on this plan, the Edmonds community has indicated it wants to ensure that the carbon sequestered in its urban forests and natural areas is maintained or increased, along with efforts to eliminate most of its GHG emissions over time. Edmonds also wants to explore other ways that its emissions could be offset by sequestration. The strategies described below address these approaches for sequestration.

Edmonds will also feel the effects of these global changes, such as increasing human migration, resource conflicts, disruptions to food and other production systems, and other effects. It is difficult to predict how these larger scale effects will manifest locally. Many regional and local effects, however, can be predicted with reasonable certainty. The probability of any particular outcome is typically expressed as a range because much depends on how well the world society responds to climate issues. If one has high degree of faith that society will respond quickly and extensively, then the lower end of the range is more likely. If one doubts that society will respond quickly, the higher range should be considered the more likely outcome.

Regionally and locally, climate change is expected to include:

- Higher temperatures, including more extreme high temperatures in summer. By mid-century, average annual temperatures in the Puget Sound region are projected to increase by 4.2°F to 5.5°F (2.3°C to 3.1°C) compared to the 1970–1999 average, and continue to rise through at least 2100.[4] The hottest temperatures are expected to rise by over 6°F (3.3°C).
- More frequent and more intense precipitation events in the Puget Sound region.[5] For Example, King County anticipates a 7% to 54% increase in the 10-year hourly rainfall event by 2080. (Although estimates have not yet been made for Snohomish County, results are likely to be similar.)
- More rainfall instead of snow in the winter, resulting in 38%–46% less snowpack in the Cascades, and decreasing summer water supplies and summer streamflows.[5]

1 Munia et al. 2020; Mbow et al. 2019.

2 Climate Central 2015.

3 IPCC 2019.

4 Snover et al. 2019.

5 Mauger et al. 2015.

- Increasing frequency of wildfire and length of wildfire season along the West Coast including inland areas east of the Cascades, with associated smoke reaching Puget Sound.
- An 89% likelihood that sea level in Edmonds will rise 1 foot by 2100, and a 1% chance that it will rise by 5 feet or more. In either case, sea level will continue to rise into the next century.[6]

These effects have already begun. Globally, the years 2013–2021 all rank among the 10 warmest years on record, with 2021 being the 6th warmest on record. Locally, 2021 included the three hottest days on record. Downtown Edmonds saw its first ever temperature of 100 degrees, giving a taste of what higher future temperature extremes mean for the region. Tides in early 2022 reached record highs throughout Puget Sound. In the Puget Sound region in 2018, wildfire smoke led to 24 days of poor air quality, including nine days that were considered either unhealthy for sensitive groups or unhealthy for everyone.

The ways these changes will affect frontline communities in Edmonds need to be better understood, but we do know that some people will have a harder time adapting than others. For example, extreme summer heat causes heat stress, including death. More than 80% of deaths from heat stress are among people over 60 years of age, and Edmonds has a high percentage of people in this age group.[7] The problems of heat stress are compounded when air quality is poor, because keeping windows open allows dangerous levels of particulates. Again, older individuals are among the most susceptible, as are young children and others. Many homes in Edmonds do not have air conditioning, and the cost of purchasing and operating air conditioners can be especially hard for people living on lower and fixed incomes. Community solutions to these types of issues may range from emergency cooling centers, to subsidies for energy-efficient cooling systems, to planting trees for shade.

average annual temperatures **increase by** **4.2°F to 5.5°F** by 2100

38%–46% less snowpack in the Cascades by 2050

50% likelihood of a **2–5** foot rise in sea level in Edmonds by 2100

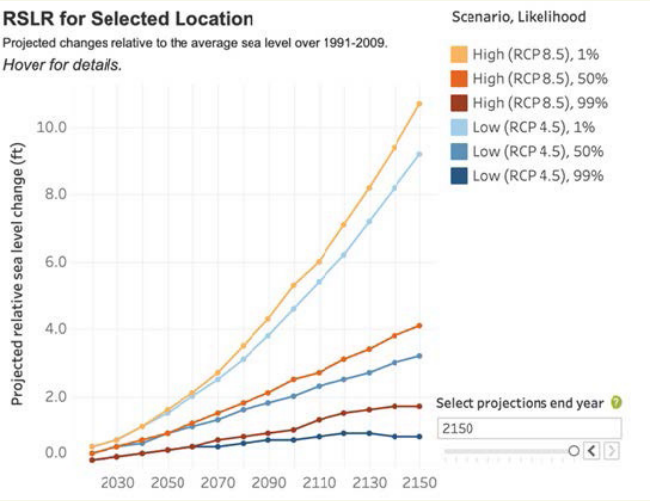

Figure 11: Relative Sea Level Rise (RSL) expected for Edmonds WA.

Source: Miller et al. 2019

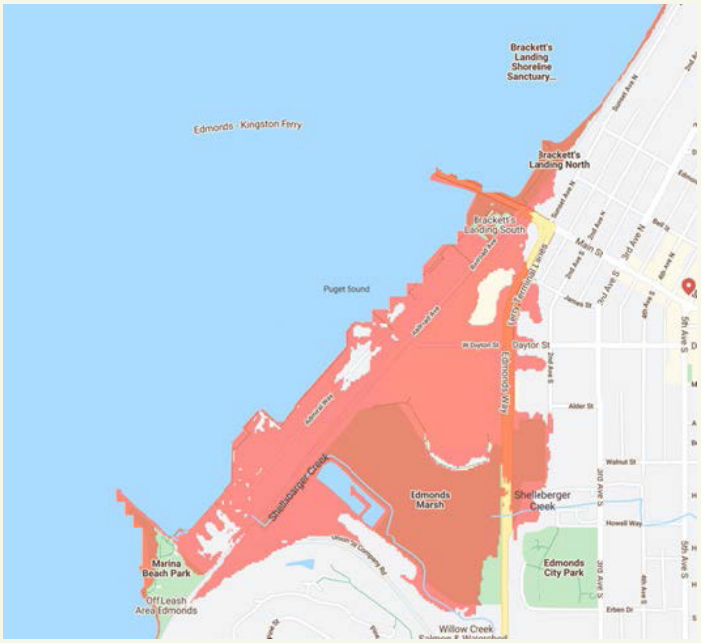

Figure 12: Inundation of Edmonds shoreline with 5 feet of sea level rise at high tide.

Source: Climate Central 2022

6 Miller et al. 2019.

7 Kenny et al. 2010.

Edmonds must consider strategies for adapting to the effects from climate change that include:

- Extreme heat events that will place stress on residents, especially those who do not have air conditioning in their homes.
- Sea level rise that will frequently inundate areas of the Edmonds waterfront and downtown before the end of the century.
- Changes in storm intensity that could overwhelm stormwater systems and damage roads and other infrastructure.
- Risk of water shortages during hotter, drier summers.
- Air quality issues due to wildfire smoke.

What the City has already done:

- Adopted stringent policies to preserve our wetlands in the late 1980s and to limit the impacts of hillside development in the 1990s.
- Committed to a set of environmental principles, policies, and goals for future action with Resolution 1700 (April 2008).
- Recognized the interrelated nature of environmental, economic, and social sustainability through the Sustainability Element of the City's Comprehensive Plan.

Since the last CAP was prepared (2010):

- Added requirements for shade trees and rain gardens in parking lots to land use code.
- Identified tree canopy coverage and areas where it could be increased
- Continued education and outreach programs for watershed and water conservation awareness and other environmental concerns.
- Adopted an integrated pest management approach in parks resulting in a 60% reduction in pesticide use, and currently phasing out use of "Roundup".
- Utilizing "in-house" wood chips and leaf mulch for weed suppression and soil building in parks.

Strategies and Actions:

To address these concerns, Edmonds will pursue three general strategies:

Strategy EN-1: Increase Carbon Sequestration

As noted in the GHG Inventory section, Edmonds is currently emitting GHGs and will likely continue to do so, even under the most optimistic scenarios. Forests, marshes, and even garden landscapes have the capacity to remove carbon dioxide from the atmosphere and store it as carbon in wood, leaves, and roots, which is sometimes called carbon sequestration. Plants also reduce the potential for heat buildup, such as occurs in concentrated areas of paving and buildings, and can reduce energy costs for cooling. Forests provide benefits such as reducing runoff and erosion and removing toxic substances from air and water, as well as providing recreational and aesthetic values. For these reasons, Edmonds should preserve and, where feasible, expand its urban forest and natural areas.

Edmonds adopted an Urban Forest Management Plan in 2019 to provide guidance for managing, enhancing, and growing trees in the City of Edmonds over the next 20 years. Special emphasis is placed on managing trees on public property and along the public rights-of-way. The plan includes goals to maintain citywide canopy coverage, manage public trees, incentivize protecting and planting trees on private property, and inform the community on tree selection, planting, and care (e.g., "right tree, right place").

The Edmonds Marsh is another natural area with carbon sequestration potential. Although the sequestration potential has not been determined, plans for restoring this area to an intertidal marsh come with hopes that this could also have the benefit of increasing the carbon stored in the soils of the marsh.

Actions:

Environment		Potential to Reduce GHGs	Degree of City Influence
Strategy EN-1: Increase Carbon Sequestration			
EN-1.1	Adopt a canopy coverage target for the city.		High
EN-1.2	Identify pockets of woodlands and marsh land that the City could purchase to add to our parks system.		High
EN-1.3	Identify City parks and open spaces where carbon sequestration could be increased.		High
EN-1.4	For fee-in-lieu mitigation sites, prioritize sites that sequester carbon.		High
EN-1.5	Update the City Street Tree Plan to prioritize increasing tree cover in appropriate places along the city's street rights-of-way, especially in areas of low canopy coverage.		High
EN-1.6	Explore application of biochar from the wastewater treatment plant to sequester carbon and improve soils in parks and residential developments.		High
EN-1.7	Assess the health of and changing stress on Edmonds' urban forest and develop strategies to prevent loss of trees to heat, drought, and insects.		Moderate

Strategy EN-2: Explore Other Methods for Offsetting Edmonds' GHG Emissions

Edmonds can also meet its GHG reduction goals by purchasing offsets for its GHG emissions. Carbon offsets allow a business, a government, or an individual to pay someone else to eliminate a given quantity of greenhouse gases from the atmosphere. Numerous ways are being explored for sequestering carbon, including industrial technology, modified agricultural practices, planting forests, and restoring salt marshes or kelp forests. This strategy can also benefit other community sustainability goals such as supporting local agriculture or salmon recovery.

Offsets might also include regional or international efforts such as buying cleaner-burning cookstoves in developing countries to reduce deforestation, financing a wind turbine generator that displaces fossil fuels on the power grid, or restoring a section of tropical forest that takes in carbon from the atmosphere. Advocates say that offsets combat climate change, protect nature, and route money to the parts of the planet that need it the most, and must be part of the solution to limit warming.

However, carbon offset projects have a history of overpromising and underdelivering. Proper accountability and permanence can be difficult to ensure. Critics of offsets say they allow people to continue emitting GHGs and avoid responsibility for doing so. Any use of offsets must include a thorough vetting of the offset program, whether local, regional, or international. Otherwise, the supposed benefit may evaporate.

This strategy includes disclosing the social and mortality cost of any carbon emissions that have not been offset.

Actions:

Environment	Potential to Reduce GHGs	Degree of City Influence
EN-2: Explore Other Methods for Offsetting Edmonds' GHG Emissions		
EN-2.1 Develop a periodic calculation of the gap between Edmonds' targeted and actual GHG emissions reductions, for the metrics in this plan and provide an online dashboard to keep the public informed on progress.		High
EN-2.2 Engage in a regional conversation about offsetting GHGs.		High
EN-2.3 Calculate the social and mortality costs of carbon that would result from each Comprehensive Plan update.		High
EN-2.4 For any emissions that are not offset per metrics the tracking tool, prepare a calculation of the social and mortality cost on an periodic basis.		High
EN-2.5 Research and recommend methods of offsetting GHG emissions locally.		High
EN-2.6 Explore purchase of GHG offsets.		High

Strategy EN-3: Prepare for the Impacts of Climate Change

The impacts of climate change are widespread, and this CAP Update does not provide a full account of the extent or severity of each type of risk. This strategy focuses on preparing a more complete assessment of local risks and developing specific adaptation measures from that assessment. This includes planning for sea level rise, extreme heat, higher intensity storms, constrained water supply in summer, and other effects.

Effective planning for these types of changes can have multifaceted benefits. Adapting to sea level rise can include measures that improve and protect habitat as well as property. Techniques like increasing urban forest cover or designing energy-efficient buildings can result in better habitat and greater year-round comfort. Managing stormwater can include methods like increasing infiltration, which can benefit habitat and water quality. Reducing water use can save energy and benefit fish by protecting streamflows.

Actions:

Environment	Potential to Reduce GHGs	Degree of City Influence
EN-3: Prepare for the Impacts of Climate Change		
EN-3.1 When planning for any climate change adaptations, include an assessment of which parts of the community would be most affected and who would benefit most from the measures proposed.		High
EN-3.2 Develop a plan for adapting to sea level rise in Edmonds.		High
EN-3.3 Evaluate the risks to stormwater infrastructure from higher intensity storms, and develop plans for upgrades to the system and development codes, if necessary.		High
EN-3.4 Develop a program to achieve water conservation in existing buildings and landscaping , with a goal of reducing per capita water use 7% by the year 2035.		High
EN-3.5 Include measures in the City's Emergency Management Plan to ensure local energy supply at City operated mass care facilities, such as solar power and battery storage, in the event of electrical outages due to extreme weather or fires.		High
EN-3.6 Create a network of emergency cooling and warming centers to be available during extreme weather events.		High

Metric: Environment

2035 Target	2050 Target
Strategy EN-1: Increase Carbon Sequestration	
5,000	10,000
Number of Trees Planted in Edmonds	

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Lifestyles and Consumption

The problem, strategy, benefits:

Our lifestyles, and particularly our consumption habits, have a large effect on GHG emissions. As described in the GHG Inventory, much of our consumption results in GHG emissions somewhere other than Edmonds, and these emissions are referred to Imported Emissions. The scale of Imported Emissions is significantly larger than Edmonds' local emissions. The largest sources of these emissions include goods and furniture, meat and dairy, transportation fuels and air travel, clothing, and food.

Households with larger annual incomes typically consume more and therefore generate more GHGs than households with smaller incomes. Figure 13 highlights this relationship. The four colored bars represent different household income tiers. As can be seen, household income significantly influences emissions for the consumption of material goods and air travel as basic needs are met and more discretionary income is available. When it comes to food, people and households consume about the same quantity and composition of food regardless of income level.

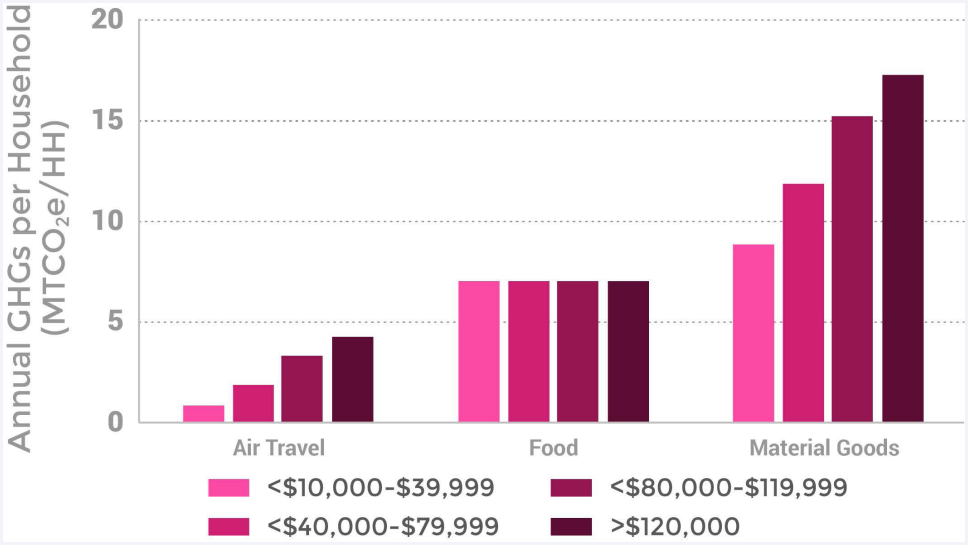

Figure 13: Comparison of household income tiers and emissions for purchase types

Source:

CoolClimate.Berkeley.edu; compiled by Good Company.

What the City has already done:

- Passed an ordinance to reduce the use of plastic bags while promoting the use of recyclable paper and/or reusable checkout bags by retail stores.
- Followed Snohomish County's lead in encouraging solid waste collectors to enhance their organic collection programs from residences and businesses.
- Created a recycling ordinance establishing a base-level recycling service for commercial and residential customers.

Since the last CAP was prepared (2010):

- Adopted Zero Waste and Beyond Waste as long-term goals for Edmonds in 2016 (Resolution 1357).

Strategies and Actions:

The two primary strategies for reducing these emissions at a community scale are to reduce waste generation, and to modify food purchases.

Strategy LC- 1: Reduce Material Consumption, Waste Generation, and Resource Depletion

Edmonds adopted Zero Waste as a long-term goal. Municipal solid waste is reflection of consumption of material goods. The City of Edmonds estimated that the community-wide waste disposal rate in 2005[1] was two tons per customer. Municipal solid waste from Edmonds is deposited at the Roosevelt Regional Landfill in south-central Washington, where methane from the landfill is recovered for energy production. However, handling and transport of waste does generate GHGs locally. In addition, reducing waste locally helps reduce pollution from manufacturing and transport globally, and reduces the community's imported GHG emissions.

Solid-waste management uses a hierarchy of approaches:

- Reduce the amount of waste created through the efficient use of resources, more durable products, less packaging, and less overall purchasing.
- Reuse products and packaging as much as possible.
- Recycle discarded products and packaging, and turn organic materials into compost or feedstock for energy production.
- Restrict the types of materials that can be used (plastic bags, Styrofoam, etc.).

Actions:

Lifestyles and Consumption		Potential to Reduce GHGs	Degree of City Influence
LC- 1: Reduce Material Consumption, Waste Generation, and Resource Depletion			
LC-1.1	Reduce barriers to achieving Edmonds' zero-waste goal.		High
LC-1.2	Increase public recycling bins in partnership with local businesses.		High
LC-1.3	Require recycled products for City-produced printed materials.		High
LC-1.4	Educate homeowners and businesses about composting.		Moderate
LC-1.5	Educate the public about using safer, non-toxic materials.		Moderate

1 City of Edmonds, 2009. Greenhouse Gas Inventory - Community Analysis.

Strategy LC-2: Modify Food Purchases

People need to eat, and dietary needs and preferences vary widely, so it is unwise to make generalizations about what foods people eat, or should eat. The vast majority of food consumed in Edmonds comes from elsewhere, grown in a wide variety of environments using wide array of methods. However, there are two important changes in food consumption that most households can apply:

- Reduce the over-purchasing in small (one- or two-person) households, to reduce waste.
- Reduce consumption of snacks, ready-made food and drinks, and other foods with high caloric content and low nutritional values that are not recommended for a healthy diet. These foods produce little nutritional benefit while generating a significant portion of the total emissions from food production, packaging, and delivery.

Producing food at home and buying locally grown food are ways to incorporate these changes into our food consumption. An additional positive impact of supporting local food producers in a diversified local economy.

Actions:

Lifestyles and Consumption		Potential to Reduce GHGs	Degree of City Influence
LC-2: Modify Food Purchases			
LC-2.1	Educate smaller households on ways to reduce food waste.		Moderate
LC-2.2	Educate consumers benefits of consuming less pre-packaged and more plant-based foods.		Moderate
LC-2.3	Involve community in identifying City parks and other property, both City-owned and private, as potential sites for neighborhood public gardens.		High
LC-2.4	Continue to promote local farmers' markets.		Moderate

Metric: Lifestyle and Consumption

2035 Target	2050 Target
Strategy LC-1: Reduce material consumption, waste generation, and resource depletion	
75%	100%
Reduction in Solid Waste Taken to Landfill	

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Tracking Progress

Accounting for progress in reducing GHG emissions at a community scale can be a challenging and laborious process. It is important to know how well we are doing, but the time and effort involved in getting a complete picture might be better spent on some of the strategies identified above. However, progress can be estimated by looking at a few key metrics. The best metrics are those for which data are readily available, where results can reasonably be predicted from the data, and where the outcome is expected to result in a noticeable change within the timeframe being studied.

As part of this CAP Update, our consultants prepared a tracking tool that focuses on a key metric for each of 10 strategies. Table 1 lists the strategies along with the metrics used as indicators for each. This will allow the City to estimate progress in reducing local emissions on an annual basis, without having to do a complete new inventory. While these metrics do not address every aspect of the community's GHG emissions, tracking them will allow the community to see real progress being made, or not, on the strategies identified in this plan for reducing GHG emissions.

The tracking tool includes a number of assumptions built off existing information about GHG emissions, population and employment growth, commuting patterns, and other factors. The approach taken is conservative, to ensure that GHG emission reductions are not overestimated. For example, it accounts for gradual improvement in the fuel efficiency of cars mandated by federal regulations. The fact that many manufacturers are moving rapidly toward electric vehicles is not factored in.

Using this tracking tool, the consultant worked with City staff to estimate how aggressively each strategy might be applied, using 2035 and 2050 as planning horizons. These two horizon years were selected because 2050 is the date by which the City's science-based target mandates the full mitigation of GHG emissions (net-zero emissions), and 2035 was an approximate midpoint. The tracking tool provides an estimate of how much GHG emissions would be affected if all of the strategies are on track by each of the planning horizon years.

The graph in Figure 14 depicts the path that Edmonds emissions reductions will take between now and 2050, assuming success in all strategies being tracked, compared to the overall net-zero target set by this plan. As shown in Figure 14 there is still a reduction gap of 95,070 MT CO2e for 2050.

A reduction gap means that further measures will be needed. In particular, fossil-fuel based gas (natural gas) must either be replaced with carbon-neutral gas, or eliminated from use, and refrigerants must be either switched to carbon-neutral refrigerants or all leaks must be eliminated. These two changes would substantially reduce the gap, but require technological changes that have yet to become economical. Even with these changes, there will likely be the need for some carbon sequestration, as discussed in Section 7, Environment. Carbon sequestration is also evolving. Technological advances for some industries and the use of natural systems, such as "blue carbon" sequestration through restoration of marine environments, offer hope for economically viable solutions in the near future.

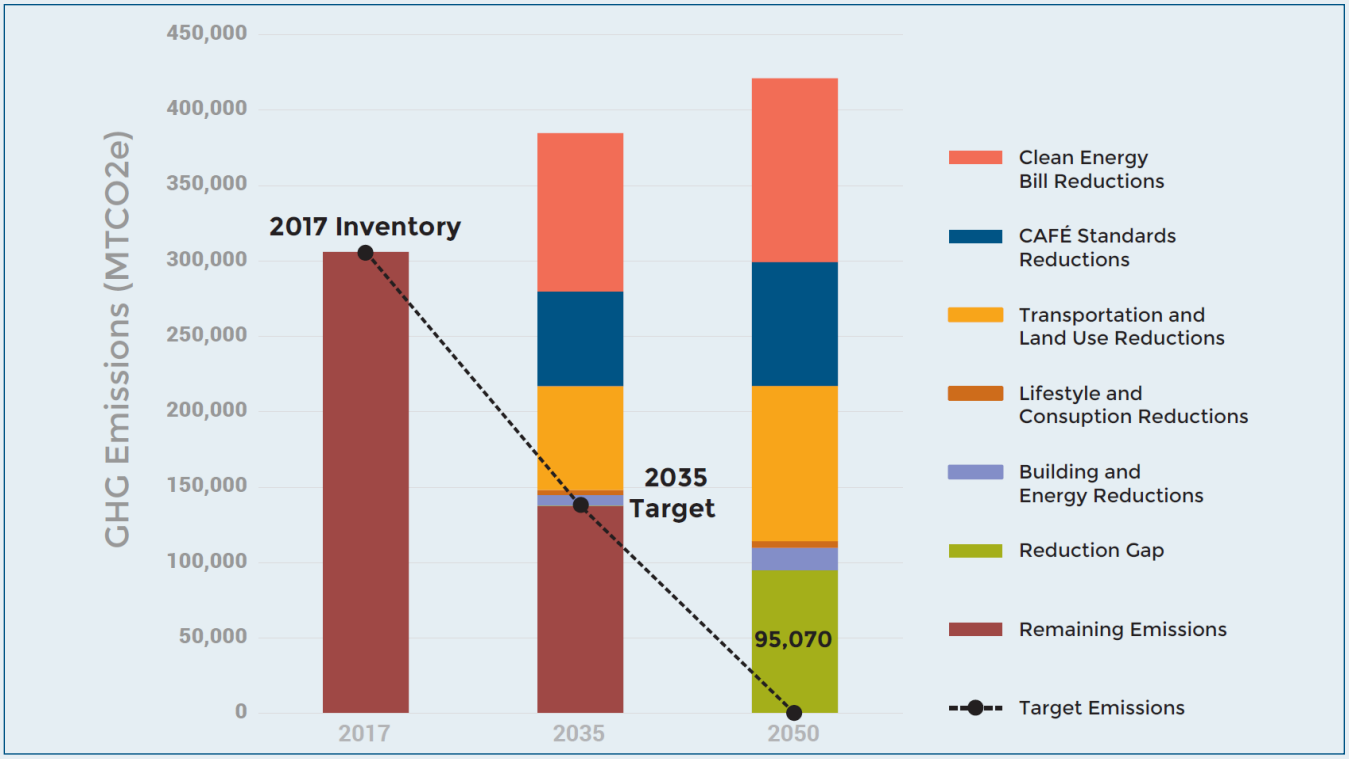

Figure 14: Edmonds GHG emissions, Targeted emission reductions, and redcution gap by 2050.

2035 Target	2050 Target
Strategy BE-1: Replace Fossil Fuels used in Buildings with Renewable Energy Resources	
430	700
0	0
Annual GHG Savings (MT CO_2e)	
Number of New Residential and Commercial Solar Photovoltaic Systems Installed	
Strategy BE-2: Improve Energy Efficiency of Existing Buildings and Infrastructure	
18%	33%
3,574	6,670
Annual GHG Savings (MT CO_2e)	
Percent of Existing Residential and Commercial Area Retrofitted	

2035 Target	2050 Target
Strategy BE-3: Require the Design and Construction of New and Remodeled Buildings to Meet Green Building Standards	
75%	100%
3,272	7,870
Annual GHG Savings (MT CO_2e)	
Percent of New Residential and Commercial Development LEED-Certified or meeting Net-Zero Carbon Emissions	

2035 Target	2050 Target

Strategy TR-1: Reduce VMT through Sustainable Land Use

2035 Target	2050 Target
3,000	5,400
4,781	5,737

Annual GHG Savings (MT CO_2e)

Residential units developed in centers

Strategy TR-2: Reduce VMT by Improving Transit Systems

2035 Target	2050 Target
20%	30%
3,792	4,807

Annual GHG Savings (MT CO_2e)

Percent of workforce commuting by transit

Strategy TR-3: Reduce VMT by Promoting Active Transportation

2035 Target	2050 Target
5%	12%
800	2,177

Annual GHG Savings (MT CO_2e)

Percent of workforce commuting on foot or by bicycle

Strategy TR-4: Promote Vehicle Sharing and Flexible Work Environments

2035 Target	2050 Target
15%	25%
8,700	9,229

Annual GHG Savings (MT CO_2e)

Percent of Workers Carpooling and Ridesharing

Strategy TR-5: Promote Low-Carbon Vehicles

2035 Target	2050 Target
19,000	51,800
50,734	81,046

Annual GHG Savings (MT CO_2e)

Number of electric vehicles registered in Edmonds

Strategy EN-1: Increase Carbon Sequestration

2035 Target	2050 Target
5,000	10,000
131	262

Annual GHG Savings (MT CO_2e)

Number of Trees Planted in Edmonds

Strategy LC-1: Reduce Material Consumption

2035 Target	2050 Target
75%	100%
3,257	4,343

Annual GHG Savings (MT CO_2e)

Reduction in Solid Waste Taken to Landfill

* Although this metric will not help reduce GHG after the electric grid is carbon neutral in 2030, prior to that date, cumulatively it will produce enough electricity to reduce GHGs prior to that date by approximately 12,000 MTCO2e.

TOTAL	Total Reduction (MT CO2e)	1.5°C Scenario Target Reduction (MT CO2e)	Reduction Still Needed to Reach Target (MT CO2e)	Percent of Target Achieved
2035 Annual GHG Savings (MT CO_2e)	79,121	79,316	195	100%
2050 Annual GHG Savings (MT CO_2e)	122,141	217,210	95,070	56%

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